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Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160.
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50 cents a copy; $12 a year in the U.S.; $20 a year for Canada and PUAS; all other foreign, $36 a year. Four weeks notice required for change of address.

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Computerworld can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

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Despite Operation's Massive Scale

IRS System Ready to Handle Rebates

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The much-debated tax rebate package, signed reluctantly into law by President Ford on March 29, entitles about 78 million Americans to income tax rebates ranging from a minimum of $50 to a maximum of $200 each.

The Internal Revenue Service (IRS) has completed debugging the programs needed to process, print and mail these rebates and, according to IRS press spokesman, Wilson Fadely, the IRS National Computer Center in Martinsburg, W. Va., has scheduled the first master file pass for April 27.

The bulk of the processing – about 67 million records – is expected to be completed in approximately five weeks.

Despite the massive scale of the operation – in all, 1,400 hours of CPU time will be needed – it doesn't seem to faze the IRS. Fadely pointed out that this represents only about 25% of their workload during this time of the year.

Rebates will be batch processed from master tapes held at the Martinsburg center. This IRS installation is equipped with six 512K IBM 360/65s with 18 tape drives and one 370/165 with 2M bytes of memory and 50 tape drives.

According to present plans, the rebate job will be completed in five 320-hour cycles, Fadely said. The first will extract the names of taxpayers from a master tape coded not by Social Security number but with a unique, 14-digit number.

Then, a program based on a simple formula coded in Assembly language will be run against those master tapes to determine whether the taxpayer paid any taxes or has any liability for taxes and, if so how much. In addition, the taxpayer's debits and credits will be added to find the net sum owed to or by him.

During the same posting and analysis run, the amount of rebate owed to the taxpayer will be computed.

Early Filers Processed First

Taxpayers who filed early and have received their refunds, if refunds were due, will be processed first and a rebate check will be authorized. The same procedure will be repeated until all rebates are processed.

Returns that are still somewhere in the computation process will be processed for taxes and rebates simultaneously. If a taxpayer is to receive a refund as well as a rebate, that amount will be remitted in the same check.

The processing results in about 10 different types of output tape records.

One type goes to one of seven regional Treasury Department dispersal centers to print checks for mailing. Each dispersal center can churn out 12 million checks per week. The first checks will be mailed May 9.

Another goes to the regional offices to print "first notices" for taxpayers who filed but have underpaid their taxes.

Still another goes to IRS service centers scattered throughout the country and becomes part of an on-line integrated data retrieval system which these centers, as well as the district offices, can access via CRT terminals to provide taxpayer information on the status of their accounts or rebates.

The taxpaying process is decentralized and takes an almost circular path. Rather than sending all returns directly to the Martinsburg center, the taxpayer mails his return to an IRS service center in his locale. There are 10 in all.

Here the mail is opened, sorted and assigned a 14-digit "document locator number." This unique code is based on the date the return was received and where the hard copy is to be stored.

Assuming the form has been filled out correctly and signed, it is sent to direct data entry where operators key the information onto tape. Night shift operators verify the data for correctness and, after verification, the tapes are shipped by air to the Martinsburg center.

Assuming the tapes are good, the figures are computed, and all information needed to send out notices or checks is output on tape and airshipped to regional dispersing offices or back to the regional centers where all special notices are printed and mailed.

A hard copy is filed at each regional center.

As for who gets a rebate, the IRS said only citizens who have settled all tax obligations will receive one. In cases where taxpayers owe a balance to the IRS, the amount of the rebate will be credit against that outstanding balance.

Taxmen Outsmart Programmer

By a CW Staff Writer

JAMAICA, N.Y. – An unemployed computer programmer is awaiting sentence after pleading guilty to two counts of attempting to defraud the Internal Revenue Service (IRS).

The defendant, Alan H. Goodman, 29, of Arlington, Va., was seized at the post office here after signing for a sealed envelope addressed to him and containing a federal income tax refund check.

According to Assistant U.S. Attorney Raymond Dearie, Goodman filled out 10 Form 1040s, each claiming a $1,829 refund, signed his name and mailed them to IRS service centers throughout the country.

Goodman gave his residence as Queens and his address as Kew Gardens, General Delivery, according to Dearie.

In keeping with routine IRS processing, the returns were input at the regional service centers and forwarded to the National Computer Center in Martinsburg, W. Va. for processing against the master file.

At this point, the duplication was discovered, and action was initiated.

When Goodman went to the post office to determine where tax refunds addressed to Kew Gardens, general delivery, would be held, postal inspectors were alerted.

IRS agents were standing by when Goodman returned a few days later and arrested him immediately after he signed for the refund check.

"Goodman went completely limp – became an instant vegetable when they arrested him," Dearie said. He was later taken to Brooklyn Federal Court in a wheelchair.

Goodman pleaded guilty both to mail fraud, punishable by up to five years imprisonment and a maximum fine of $1,000, and to false claims, punishable by up to five years in prison and a maximum fine of $10,000.

He was released on $50,000 personal recognizance bond.

"It's too bad," Dearie remarked. "He's no dummy. The man has both a B.S. and a Masters from Cornell University in electrical engineering."

Goodman was employed until recently by American Management Systems in Arlington, Va.

Correction

In the article "Former User Sues Singer; Claims Software Fraud" [CW, April 2], IBM was inadvertently mentioned through a typographical error.

The article should have read, "IMA and Singer 'acted together to fraudulently induce' Hi-Line to use their services when they both knew neither could provide the equipment and programming required to do Hi-Line's work, as they said they could, the suit charged."

On the Inside This Week

NEWS

Data Center Manager's Job Unmanageable 4
Automated Profiles Shoot Down 1776 Radicals' Image 5
Microcomputers More Revolutionary Than Evolutionary . .6
Little Need Seen for Specialized Common Carriers 6

EDITORIAL

Editorial: What Are Your Concerns? 8
White Hat, Black Hat: Grosch's Law Revisited 9
University Alleviating Shortage of Business DP Grads 9
Fourth-Generation Hardware Still in First Generation 10
DP Training a 'Potential Profit Center' – Not Luxury 11

SOFTWARE & SERVICES

Data Base Eases Calculations, Lets Financiers Plan 15
'Adabas' Features Sequential Data Base Reading 16
'Autoflow II" Creates Documentation at System Level . . .19
TSO Cuts T/S Costs, Aids Programmer Productivity 20

COMMUNICATIONS

Data Sets Most Concentrated Area of Interconnection . . .21
Research, Pilot Testing Determine Customer Needs 21

TERMINAL TRANSACTIONS

Airline Writes Teletickets Using Terminal Network 23
Olivetti TC 800 Works in Financial Institutions 26

SYSTEMS & PERIPHERALS

CMI Adds 370/135 Memory for 40% Below IBM Cost 27
Yarn Maker's System Spins Tale of Inventory Success 28
Real-Time Project Proves UK Bank Boon 29

MINIWORLD

DEC Releasing Series of Upgraded PDP-15s 31
DEC Packaged System Designed to Reduce Energy Use . . .33
Mycro-Tek MT 8080 Lets User Configure Own I/O 34

COMPUTER INDUSTRY

EFTS to Nourish New Markets by '77 35
IBM's '75 Earnings Seen Rising Slower Than Before 35
System/32 Expected to Increase Independent Sales 37

FINANCIAL

GA Reports Loss for Quarter, Half Year 46
Profits Soaring at MAI Due to New Revenues Mix 46

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Solution? 'Bust Up Department'

DP Center Manager's Job Unmanageable

By Don Leavitt
Of the CW Staff

CHICAGO – "I believe the computer department should be busted up" because that is the only way to overcome "the number one data processing problem – the DP manager who is out of tune with his boss," according to Robert Hoyt, executive director of the State of Illinois Management Information Division.

Addressing a luncheon session of the Computer Caravan here last week, Hoyt admitted he was not alone in recognizing the problem. But he disagreed with "most of the literature" that puts the blame for poor communications "squarely at the feet of the DP manager."

The fact is, he went on, "the whole concept of the computer department is wrong." Any organization headed by one person responsible for systems planning and implementation, processing production and data center operation has an impossible assignment.

"Ask yourselves the question: 'Have you ever seen or even heard of a person carrying the title of vice-president of research and development and manufacturing?' " He challenged, adding "it simply doesn't happen – for some very good reasons."

One person cannot handle both jobs. If he spent half of his time in the research lab and half in the manufacturing facilities, both would suffer.

"No matter how he divided his time, one or the other would suffer, and he would probably be evaluated poorly in both areas.

"Yet that is exactly what the DP manager is asked to do," Hoyt said.

It is not surprising the DP manager is often out of tune with the organization and has a poor relationship with his boss, he said. "Given the basic conflicts of the situation, it would be a small wonder if he had a poor relationship with his wife," he quipped.

It is not so much that the span of control is too great, Hoyt said. "It's more a case that the type of thinking required in the two areas is very dissimilar . . . It is impossible to continually shift gears between systems planning and running a data center."

Go Own Ways

To resolve the problem "the data center manager and all of the operations and systems programming software personnel should go one way, and the system planners and implementers should go the other. These two groups should report to completely separate and independent vice-presidents," according to Hoyt.

"I think it is completely appropriate for the data center manager to report to the vice-president of manufacturing . . . and be measured like any of the plant managers in terms of such things as uptime, operating efficiency, unit costs, etc."

Perhaps, under those conditions, "some of the emotional equipment procurement decisions that plague the DP industry today would become a thing of the past," he said.

Once the operations functions have been split off, the chief systems planner is free to do the other half of the job. Because he is no longer responsible for the hardware, "he is free to do all the things DP managers are so often criticized for not doing," Hoyt noted.

"Only after he has given up the hardware responsibility can he become a member of the policy- and decision-making team . . . And only when he is a real member of that team can he be in tune with the organization," the speaker added.

At that point, the chief systems planner can stop talking like a technician and start communicating better. DP will start to influence the direction of the organization.

"There will be better understanding . . . and more involvement by corporate executives in DP decisions," Hoyt predicted.

All of these things go together and must happen if computers are to realize their full potential in the difficult years ahead. "The choice is yours, but the choice is very clear," he said. "If you are a data center manager and want to stay close to the hardware, the sooner you get yourself out from under the DP manager, the better.

Tenn. County Under Investigation For Single Sourcing With IBM

(Continued from Page 1)

equipment as early as Feb. 7, 1973," John W. Thomas Jr., a Memphis accountant, stated in a report he recently prepared for county officials on the computer acquisition.

But, TLEPA's Lowe said Memphis and Shelby County "were well aware, as all of our subgrantees are, that equipment costing more than $500" requires bidding.

TLEPA learned of the lack of bids in early 1974, "either through a Honeywell salesman or routine monitoring of the program," Lowe recalled. By then the computer had already been installed.

The Tennessee agency warned Memphis/Shelby County the lack of bidding could prevent LEAA reimbursement of lease payments for the 135, he said.

Memphis/Shelby County appealed to Washington, but the LEAA refused to accept its grounds for sole sourcing and disallowed reimbursement of the lease payments.

The Memphis/Shelby County criminal justice operation was left in a position where it could apply its $575,730 reimbursement grant for 1973/1974 to salaries, travel and other non-CPU costs.

Although the 370/135 was costing $28,000/mo, the Memphis/Shelby County criminal justice commission returned $185,710 to TLEPA unspent.

Another View

In his report to the county officials, though, Thomas took another view of the computer acquisition.

"There is an opinion that if Shelby had bid the original equipment . . . substantially more funds would have been available for reimbursing the equipment costs," he stated.

Thomas outlined a hypothesis in his report that a bidding procedure begun on May 30, 1973 (the organization of the city/county effort) would take one month to advertise, review and award the winning bid. He estimated 12 months from award date to delivery.

This would have delayed equipment arrival until July 1974, the start of a new fiscal year in which $350,000 was the maximum TLEPA grant Memphis/Shelby was to receive, regardless of whether its mainframe lease was reimbursable.

The Memphis/Shelby County criminal justice commission spent all of that $350,000 on salaries, supplies and other costs, Thomas said.

There is a $325,000 ceiling on reimbursable expenses for the 1975/1976 fiscal year, Thomas noted, making it unlikely Memphis/Shelby County could gain larger future reimbrusements if it had not sole sourced the machine, he said.

And in N.J. . . .

JERSEY CITY, N.J. – The Hudson County Prosecutor's Office has subpoenaed information from both IBM and Jersey City on the award of a lease contract to IBM last fall even though NCR Corp. had submitted a lower bid.

Jersey City may have violated a state bidding statute by choosing the $13,960/mo IBM 370/125 over a $13,142/mo NCR system, City Councilman Thomas Maresca charged [CW, Oct. 9].

The city's business administrator, Peter A. Korn, said, however, the city acted on the report of an evaluation committee which indicated the IBM system more closely matched the city's needs.

IBM stated it "is cooperating fully with the Hudson County Prosecutor's Office and has no reason to believe it has not acted properly and within both the spirit and letter of all applicable laws, rules and regulations governing its business with Jersey City."

'Demand System' Lets Collegians Sign Up for 'Unscheduled' Classes

MIAMI – College registration has traditionally meant schedule conflicts, closed-out courses and long lines for the frazzled student.

But automation has made the whole process almost effortless at Miami-Dade Community College, where a computer-based system allows students to sign up for classes without knowing when they will be taught.

Called a "demand system," it's the first of its kind and has taken five years to develop. Students choose courses from a tentative list and then decide when they'd like to take them (options are morning, afternoon or night).

The information is fed into one of several terminals on the four campuses and transmitted to an IBM 370/155.

A schedule is then developed that takes into account as many of the students' wishes as possible. Individual class schedules are mailed approximately three weeks before the beginning of the semester.

Previously, students had to study a list of courses with predetermined times, pick up class cards at various spots on campus and then stand in long lines to register, a process that took at least an hour. Now, students can register in 15 minutes, according to Dr. J. Terence Kelly, assistant to the president.

The idea for the system was first conceived by Dr. Robert McCabe, executive vice-president of the school. A project staff, headed by Allen Thorn, was hired to design the system, which is run on existing hardware. It is now being used for the first time to register students for the spring term beginning May 2.

Students have eight weeks to register, and Kelly feels they have accepted the system well, although there was some initial apprehension.

Kelly said the major advantage of the system is that it will allow the best possible match between the needs of the students and the educational plan.

Microprocessors' Advent Seen Altering Traditional Data Center

(Continued from Page 1)

than the present systems and would obviously eliminate the need for any higher level languages in the future, he added.

Decentralizations of Functions

With low-cost microprocessors that can be dedicated to an application, the system intelligence and system functions will be distributed throughout an organization, he indicated, instead of being centralized.

For example, almost all terminals will have built-in microprocessors that will have a great deal more capability than the present ones, he noted.

To illustrate, a terminal in a payroll department could be used off-line for all the routine payroll processing and only go on-line to a larger system for exception reporting or other management reports.

At the same time, the advent of microprocessors will also permit fault-tolerant computing to become a reality, he said. Since it will be cheap enough to back up all of the important elements in a system.

This future architecture will also allow users to grow within a system instead of having to upgrade from system to system. A user who wishes to add applications could just plug in the microprocessor for that application instead of having to upgrade an entire system.

A system architecture would therefore last considerably longer than at present, he explained.

In all, Joseph predicted 25% of the software currently programmed into systems would be found in hardware by 1980 and, by 1990, 80% to 90% of all "software functions will be found in microcode."

One of the major factors that will force such a move will be economics, he indicated.

The price of hardware is falling so rapidly that mainframe makers soon will not have much business or revenues from selling hardware, he noted. They will then begin embodying functions previously found in software in the hardware in order to increase their revenues.

Microcode to the Rescue

By a CW Staff Writer

NEW YORK – Hardware – in the form of microcode – will rescue systems of the future from problem areas that can be seen only in terms of software today, Frederic C. Withington of Arthur D. Little indicated here last week.

One of the major requirements for all future computer systems is that they be easy to use, he told an IEEE Computer Society Intercon '75 session.

The computer manufacturers – and particularly IBM – feel the market won't expand fast enough without the development of systems easy to use, he said.

The current problem is that present software systems are often disappointing, and features that make them easy to use take up an inordinate amount of system overhead. But by 1985, he predicted, hardware will help overcome this problem.

In the next 10 years, the speed of circuits should increase by 10 to 50 times, he said, with most large-scale integration done in standardized form.

These chips will combine both processor and memory, he indicated, which will permit the designer to put some functions previously seen as software only into the chip.

Using standard microprocessors with different codes will enable the designer, therefore, to cut through the problem of software design.

The major constraint on this type of development would be the acceptance of the use of microprocessors by engineers rather than the technology itself or a lack of computer power, Withington said.

This development will be particularly important, he said, since it will make many new applications possible for the first time by relieving the industry of the software constraints it has faced in the past.

Automated Profiles Shoot Down Image Of 1776 'Radicals'

By Catherine Arnst
Of the CW Staff

LOS ANGELES – The rebels of 1776 were not quite the same breed as their antiestablishment counterparts who have dominated the news in recent years.

Instead, they were prosperous, middle-aged farmers and businessmen, according to the results of a computerized study conducted at the University of Southern California (USC).

Dr. John Schutz, chairman of USC's history department, spent four years studying the lives and backgrounds of more than 2,300 men who took part in the colony of Massachusetts' government during the 50 years before the revolution.

His data was fed into an IBM 370/158, producing a profile of the typical legislator at age 49, married and the father of eight children, Protestant and a man of importance in his hometown.

"This was a conservative revolution," Schutz explained. "People were essentially trying to safeguard their homes. It finally became apparent that British imperial methods posed as great a hazard as a war of revolution."

Schutz chose Massachusetts because it was the most beligerent of the colonies and more records were still available there. To obtain information, he searched cemetery lists, baptism records, church membership rolls, newspaper articles and family bibles.

He also dug through legislative records to establish who chaired what committee and for how long and kept track of the bills various legislators backed or opposed during the fifty-year period.

"The idea, of course, is to find out everything I can about these men – who they were, what they did, where they came from, what kinds of people they really were," Schutz said.

"To do that, I needed to know about their private as well as their public lives. So I cataloged them by age, education and religion, recorded facts on their wives and children, places of birth and death and their service in the community as well as in the legislature," he added.

The study was funded by the National Endowment for the Arts, and Schutz hopes eventually to expand its scope to include the years 1681 to 1800.

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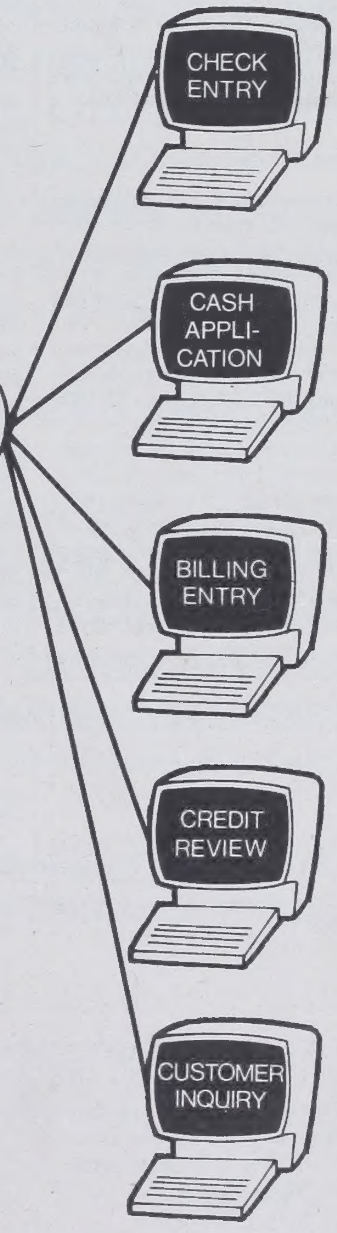

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Myriad of Application Areas to Open Up

Microcomputers More Revolutionary Than Evolutionary

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – "The effects of microcomputers promise to be more revolutionary than evolutionary," panelists agreed here last week at an IEEE Computer Society Intercon '75 session.

And the effects of the revolution are going to impact not just the computer industry but all of society, they predicted.

"When important technologies are improved by an order of magnitude, they generally have dramatic effects on the way society operates," according to William H. Davidow of Intel Corp., who noted microcomputers are providing an order of magnitude increase in price/performance over older systems.

If the technology is important enough, he indicated, "it affects not only jobs and methods of earning a living, but it may affect the entire structure of society as well."

The real importance of the microcomputer, he said, is not just that it allows an order of magnitude in price/performance increases over minicomputers, but rather that it enables users to put computer power into different systems at a low cost, opening up new application areas.

Today, he noted, there are 200,000 computers worldwide, but there are millions of applications that could use computing power but have not, due to the cost.

20,000 New Areas

Every control system in existence, whether mechanical, pneumatic or electrical, is a candidate for microprocessor control, he said, adding there must be at least 20,000 separate new application areas for such devices.

"These are primarily low-volume applications where microprocessors are employed in quantities of less than 50,000 units per year," he said.

"The cost-effectiveness of the existing microprocessors and the ease and speed with which they can be designed into these applications mean the automation of information-dependent processes is going to proceed at an extremely high rate," having an impact on society, he said.

For example, if the average application required only 100 microprocessors per year, between 10 million and 20 million systems would be shipped yearly, he said.

"To realize the significance of this, one need only consider that the labor force in the U.S. is on the order of 85 million people. If half the microcomputers built are consumed in the U.S., a significant portion of the labor force would be affected by these devices," he stated.

Therefore, he indicated, the systems will have a tremendous impact on the productivity of the national work force and possible implications for future employment.

Enormous Changes Seen

The trends in microprocessors "will inevitably force enormous changes on the world as we see it today," Carver A. Mead, a professor at California Institute of Technology, said.

With the availability of computers on a chip, the cost of DP will be reduced to an "insignificant" level, he said, adding that computer power will be "distributed in all the nooks and crannies" of future DP systems.

CW
At Intercon

A great deal of attention will therefore be needed to make the interface between the system and its users as transparent as possible, he said.

Unfortunately, "the DP industry has slithered by too long by ramming its own view of the universe down its customers throats," he said, adding, however, that "the ubiquitous nature of the technology is forcing a change, and it is none too soon."

The use of microprocessors will open up whole new product areas, he said, pointing out that, in the not-too-distant future, there may be things such as intelligent dictation equipment that does automatic transcription and so forth.

In all of these changes, there exists "a great potential," he said, for liberating people from dehumanizing tasks.

If systems of this sort are implemented with as little thought and regard for the human element as they have been in the past, however, they will no doubt be worse for the people using them than our present systems are," he said.

Bell System Called Best Bet

Little Need Seen for Special Common Carriers

By a CW Staff Writer

NEW YORK – Most users can "cost-effectively" implement their data transmission requirements using the standard offerings of the Bell System, leaving little room – or need – for the new specialized common carriers.

That's the opinion of Donald L. Dittberner, president of Dittberner Associates, Inc., he told IEEE Computer Society's Intercon '75 session on "Controversial Topics in Digital Communications" here last week.

There are both technical and economic reasons why this is so, the consulting firm president said.

On the technical side, he noted the most significant fact associated with data networks is the reduced error rate they promise when compared with the analog network.

This reduced error rate, however, has little economic impact on the user's bill, he said. Since each terminal still has to be equipped to retransmit messages, there are no equipment savings.

At the same time, he said, the economic impact of the more effective throughput of these low-error-rate lines is difficult to quantify or to prove in real life.

Furthermore, factors such as high-speed adaptive modems make the use of the Bell network easier and more effective, he said, and the use of LSI modems reduces modem cost.

Competition From DDS

On the economic side, Dittberner said extended sharing privileges on the Bell Digital Data Service (DDS) network – and the likely extension of such sharing privileges – would provide competition to the specialized carriers.

In addition, large-time-sharing networks will establish their own systems and not use the specialized carriers very much, while smaller service firms will be economically impacted by small business computers taking them out of the market for the specialized carriers.

Another factor limiting the use of such networks is the inertia of system software that favors the polled environment, he said.

Most users have software that is "available, proven and usable" and utilizes a polled environment within private line circuits, he said.

Lack of Coverage

"Attempting to change this philosophy to go to the use of specialized switched networks or packet-switched networks involves a sizable investment in software changes that many users are unwilling to undergo – particularly if only a portion of the geographic coverage of their network could be converted to the new service," Dittberner declared.

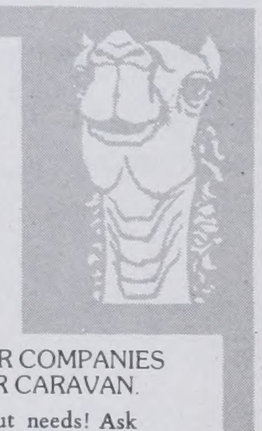
The lack of national coverage will be extremely important, he said, noting many users may make that a criteria in their selection of vendors.

At the same time, many users will not want to go to the trouble of piecing out a network from among many suppliers as would be required when using specialized common carriers, he said.

Furthermore, "the total revenues realistically available for special data carrier competition at the very low rates anticipated . . . will not be terribly attractive."

This will mean there will be "serious survival problems" for the special carriers over the next five years and that their offerings "will find only a minor niche" in users' data communications systems planning.

Because of this, he predicted only one of the proposed packet-switched networks would survive in 1980 and that its revenues would be under $10 million yearly.



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Editorials

What Are Your Concerns?

In an effort to discover the issues that concern DP people, we are running the "Second *Computerworld* Poll" and asking for your votes.

Please rank the following subjects in order of their importance to you and your installation. Use 1 for the most important, 2 for the next important and so forth. You do not have to rank each subject area.

For your convenience, you can use the postage-paid subscription envelope stapled into this issue; just write "Editorial" on the outside of the envelope so your vote can be tabulated quickly.

Please vote; we want to get as large a number of responses as we can. We'll report on what concerns *you* most as soon as possible.

____ Future IBM computer products after the 370 line.
____ Possible privacy regulations on private data banks.
____ The movement toward distributed processing.
____ The consumer problems created by Electronic Funds Transfer Systems (EFTS) and the Universal Product Code (UPC).
____ IBM's entry into the satellite communications area.
____ "Professionalism" and the possible licensing of computer people.
____ The government's antitrust action against IBM and its possible effects.
____ Budget Reductions.
____ The use of minicomputers vs. larger mainframes.
____ Standards for programming languages.
____ Future communications options such as all-digital nets and satellite service.
____ Vendor support and enhancement of operating systems.
____ The conversion from batch to on-line systems.
____ The training of DP people.

Other Categories

____ ________________
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Comments: ________________

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My job function is:

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____ DP Management
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____ Other

Identification (Optional)

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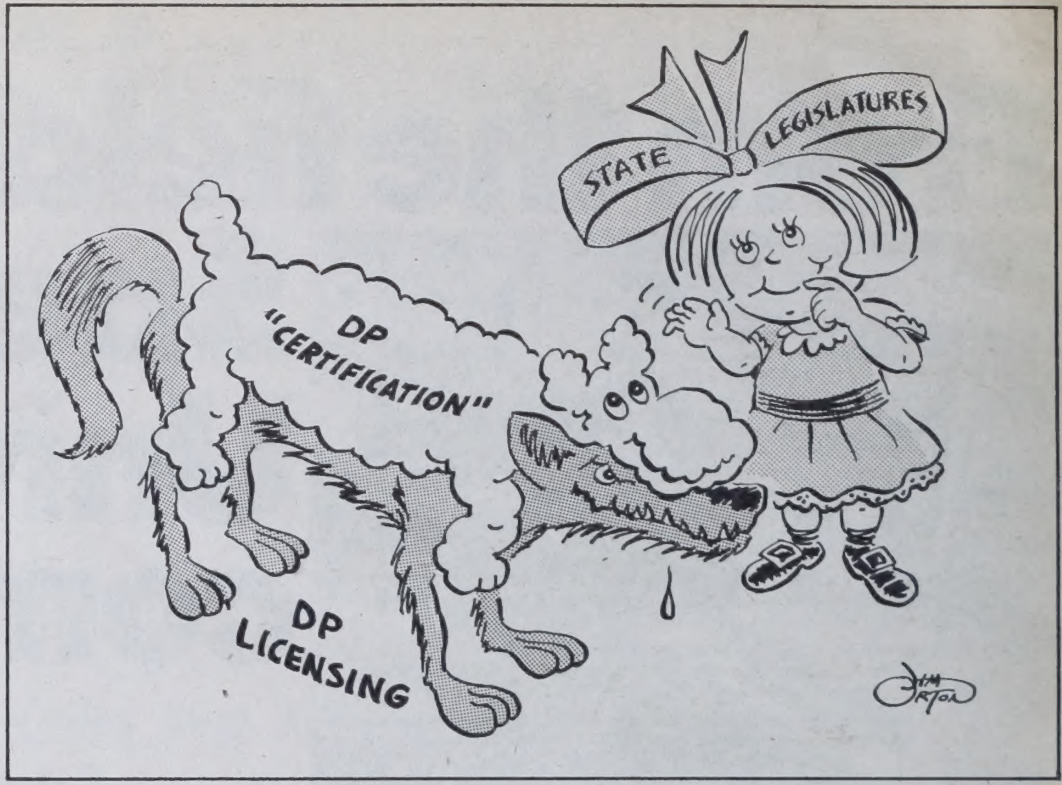
Title ________________
Company ________________



Mary's Little Lamb

Letters to the Editor

EFTS Moratorium Unnecessary

Congratulations, *Computerworld*. You can now count yourself among the ranks of other uninformed, uneducated people who fear electronic funds transfer systems (EFTS).

It may interest you to know many of us in systems and systems-related work have labored for the past 10 or so years to bring about an evolution (not a revolution) in making vast improvements to the EFTS mechanism. Many forward-thinking companies have invested millions of dollars in the R&D necessary to bring about the changes over a significant period of time.

Now the reward for this innovation is to be a moratorium during which all those who have sat around doing nothing will be allowed to profit from the developmental work of a few, and again the reward for innovation in the banking business is to be copied.

Well, I for one oppose any sort of stall game. A moratorium of any sort will give some already-too-conservative bank managements the very reason they need to cut back or eliminate EFTS programs.

I would suggest that, before you become too concerned for the "public at large," you talk to people in Atlanta, Ga., in Syosett, N.Y., in Pittsfield, Mass., in Upper Arlington, Ohio and in countless other cities in this country where progressive companies have initiated EFTS pilot programs, and I think you may be surprised to learn the public does nothing but benefit.

Anyone who knows anything about EFTS will do everything possible to oppose the moratorium.

Robert W. Myers
Baltimore, Md.

Firm Clarifies Participation

We read with interest the article entitled "Faulty Input Snarls City Audit Process" [CW, March 26]. Without entering into the imbroglio over who was responsible for the problems encountered with the Portland, Ore.-Multnomah County Fiscal Management System (FMS), we would like to clarify two areas in the article that touched upon our participation.

First of all, the use of the word "packages" to describe two components that we designed is misleading. We are not a software house with a series of canned computer programs that we peddle from city to city. The systems we developed for Portland and Multnomah County were designed to meet the financial management needs of the city and county.

Second, we did not "pack our bags and leave before adequately documenting our work," as Andy Thaler stated. We were originally asked by the city and county to complete the design of the FMS, to develop detailed and standardized clerical procedures and to assist in the implementation of the computer system. We were to work closely with the city-county Data Processing Authority (DPA) in the development of programming specifications working in close, daily contact with systems analysts from the DPA.

Before the last project team member left this assignment, we revised many of the programming specifications to reflect changes that we had made at the request of the city and the county. All of the documentation we produced was reviewed and accepted by the city and the county.

We were not "running out of money," as Thaler stated. At the time to which Thaler referred, we were operating under an open-time and materials agreement with the DPA which paid us for every hour worked by our project staff and had been for a period of two months. Since Thaler was not employed by either the city or the county at the time, he cannot be expected to know this.

There is, however, one area where we did not provide complete documentation. The detailed computer operations instructions were left to the city-county DPA's systems and programming staff to complete. We assisted in the preparation of these instructions but pointed out it would be less costly if DPA personnel completed all of the required forms and detailed instructions.

In August 1974, we were asked by the city and county to return to assist them in making some complex accounting changes to the FMS and to modify the specifications for some of the key programs in the system. None of the officials with whom we worked expressed any dissatisfaction.

Last, we wish to point out, as did Edith Holmes, that FMS is up and running and is currently producing satisfactory results.

Robert E. Swid
Senior Vice-President
Booz, Allen & Hamilton, Inc.
Washington, D.C.

Omitted But Not Forgotten

It would appear Leonard Farano's article, "Software, Upkeep Easy If User Follows Guidelines" [CW, April 2], failed to include the Wang 2200 system in the subclassification of minicomputers . . .

Frederick L. Barker II
North Syracuse, N.Y.

. . . I was distressed to find . . . Farano eliminated half of the Burroughs Corp.'s line of equipment . . .

Neil H. Waldmann
Account Manager
Burroughs Corp.
New York, N.Y.

The chart accompanying Farano's article was not meant to be an all-inclusive list, but just an illustration of how minicomputers are classified by size. Ed.

(Other letters and commentaries on Pages 10, 11 and 14.)

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☐ INVOLVED
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☐ CURIOUS
☐ EXCITED
☐ DEMANDING
☐ FURIOUS
☐ INFORMED
☐ SURPRISED
☐ ALL OF THE ABOVE

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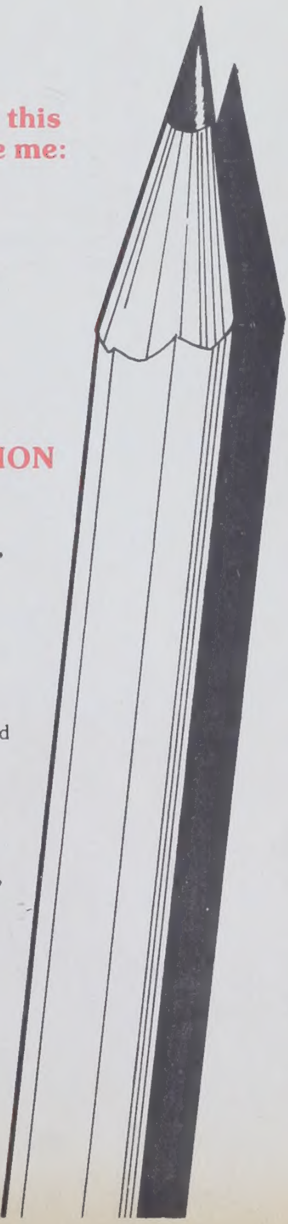

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- 20 Manufacturer (other)
- 30 DP Service Bureau/Software/Planning/Consulting
- 40 Public Utility/Communication Systems/Transportation
- 50 Wholesale/Retail Trade
- 60 Finance/Insurance/Real Estate
- 70 Mining/Construction/Petroleum/ Refining
- 75 Business Service (except DP)
- 80 Education/Medicine/Law
- 85 Government - Federal/State/Local
- 90 Printing/Publishing/ Other Communication Service
- 95 Other: ____________

TITLE/OCCUPATION/FUNCTION

- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Finance Officer
- 21 Director/Manager of Operation/Planning/ Administrative Service
- 22 Director/Manager/Supervisor DP
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 41 Application Engineer
- 42 Other Engineering
- 51 Mfg Sales Representative
- 52 Other Sales/Marketing
- 60 Consultant
- 70 Lawyer/Accountant
- 80 Librarian/Educator/Student
- 90 Other: ____________

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Grosch's Law Revisited

Don Berteau wrote a nice letter in the March 26 *Computerworld*, hoping that Ole Mose would stumble down from Sinai with new tablets. Not necessary, Don – the original law is doing just fine!

Readers will remember that the original, and genteel, form of the law is: "Economy is as the square root of the speed: If you want to do it twice as cheaply you have to do it four times as fast." What is probably known only to old-timers is that I plotted up my paltry points on a piece of scrap semilog paper in 1949 or 1950, two or three years before delivery began on mass-produced machines. The points were hard calculation(!), log tables, desk calculators, punched card machines (IBM 601, 602A, 604), relay calculators, Eniac, the SSEC, Norc, the Harvard Mark I and Mark II and rumors of Seac. Speeds were not known yet for the Eckert-Mauchly machine (later Univac I) or for the Defense Calculator and Tape Processing Machine (later IBM 701 and 702), let alone prices, and costs for the one-off machinery were the wildest kind of guesswork.

Point is not how decrepit I am, but that there was no common von Neumann architecture for all the points to which my slope-one-half whimsy was applied. If there had been array processors, or pipeline designs, or one of Aunt Grace's nutty mininetworks around, I would have plotted it up just as gaily as I did the logarithms and the microprogrammed IBM equipment – yes, the 604 and the CPC's 605!

And the line fit fine for decades, not entirely because it was used for pricing and hence became a self-fulfilling prophecy, but also because in some obscure human-related way it reflected the professional user's application of the square-rigger motto: one hand for yourself and one for the ship. Given a burst of new power, the programmer would let the boss have some and keep the rest to play with – which is also why memory, to get away from the speed thing for a moment, is always full no matter how large it is!

A modern "crate" mini is capable of submicrosecond speeds and costs practically nothing. If you can catch a company just before it files, they'll practically pay you to take one away! Ah, says the mini enthusiast, Grosch is *kaput*.

But that nanosecond speed is not the attainable speed at all, in desktop mode. You run out of numbers to crunch in less than a second, unless you are just playing games. Add on some disks, a major core expansion, some printers to dump the answers on to – now it runs and runs, at great (although considerably reduced) speed. But it isn't a $5,000 desktop box anymore, is it? Now you have a *system*! And it costs; costs a surprising amount. Without software – and by the time you buy some systems packages to manage the core and the disks and the tapes and the printer, and fiddle with data transmission protocols, and so on and so on, Grosch's Law is back in the saddle.

Don, no matter how fast and cheap the *nodes* of that pretty mininet are, the speed and the cost of real work will still be as I chipped 'em into the stone a quarter century ago. As long as we have greedy salesmen and pussy programming, most of the power of even the cleverest machines will be wasted. Square root lives!

Herb Grosch

After 17 Evolutionary Years

University Alleviating Shortage of Business DP Grads

By Walter J. Kennevan
and Richard A. Bassler
Special to Computerworld

There was a very interesting article in the Feb. 26 issue of *Computerworld* which noted that two prestigious universities, Harvard and the University of Pennsylvania, are planning programs to bridge the gap between the needs of computer science departments and those of the business schools.

Those schools will be taking this forward step in meeting the educational requirements of the community – although American University in Washington, D.C., has had such a program for the past 17 years!

At American University it is possible to take courses concerned with information systems, computer systems, operations research and other allied fields leading to bachelor and master of science degrees in technology of management.

The masters program was established in 1958 to provide qualified systems design, management science and DP management personnel with a university-level educational service to augment practical experience.

In the Beginning

Conducted by an independent unit of the university, the Center for Technology and Administration (CTA), the program initially served only the School of Business and the School of Government and Public Administration. And, in the beginning, the course offerings looked very much like the computer science commitments of today.

Most students and faculty were concerned with how the machine was to get the job done. Concentration was on the technical aspects of the hardware and the software. Programming was the axis about which the curriculum revolved.

Graduates received masters degrees from one of the several schools of the university participating in the program. The term "technology of management" was coupled with the graduate degree. For example, those graduating from the School of Government and Public Administration would receive a degree titled "Master of Public Administration: Technology of Management."

Over the years, however, with considerable liaison with the graduates of the program and the organizations they serve, the CTA has continually refined the curriculum to respond to the needs of the business and government communities. Consequently, the course offerings reflect the current requirements of the marketplace and are dynamic enough to remain consistent with the rapidly evolving technology and management demands.

As a result, in 1970 the center was authorized to offer the master of science in technology of management degree, independent of other university components.

Currently there are over 500 graduate students participating in this program. Many of the students attend on a part-time basis and almost all of the courses are taught in the evenings to meet their particular needs. In May 1974, 182 graduates received their Master of Science in Technology of Management.

Areas of Concentration

There are six areas of concentration in the technology of management discipline. These are computer systems applications (not to be confused with computer science, which is offered in the Department of Mathematics), operations research, scientific and technical information systems, management information systems, science and technology policy and administration and environmental systems management.

Students are required to complete a minimum of 36 graduate credit hours distributed among two of the six fields. There are also variable prerequisites of appropriate foundation courses in mathematics, statistics, DP fundamentals and programming.

These foundation requirements, not creditable for graduate course purposes, may be satisfied by class work taken at American University, by previous course work elsewhere or, in some cases, by qualifying on-the-job experience.

The majority of students elect the combination of computer systems applications and management information systems fields. These are the two most closely related to the applications of business data processing. They also represent the specialties which DP practitioners have been asking for to meet the needs of management.

The program envisages the selection of one of the two fields as the major field and the other as the minor. A six-hour comprehensive examination in the major field culminates the program.

For those students who so desire, the center offers the opportunity to select their minor field from one of the other schools or departments of the university. There have been special programs involving the School of Business, the School of Government and Public Administration, the Department of Economics, the Department of Chemistry, Department of Psychology and Urban Affairs, to mention a few.

Reader Commentary

In some cases, the special programs are built involving the consortium of universities in the Washington area.

As a result, it is difficult to imagine a student's needs, if closely concerned with the computer and management information, which cannot be satisfied since CTA provides a broad service to the entire university and the Washington community.

Bachelor's Program Launched

The graduate program has been so successful that, in the fall of last year, the center launched a degree program for a bachelor of science in technology of management. This program now has some 200 students enrolled.

It, too, strives to meet the requirements of each student and the business community in applications oriented programs. The traditional computer science curriculum was therefore avoided almost in its entirety.

The typical student comes to American University from one of the area community colleges with an associate degree in a computer or business related discipline.

Upon graduation from the center's program, the student will have covered basic business courses, accounting, business law, mathematics up to a semester of calculus, two semesters of statistics and a selection of courses from business, economics, government, natural science, international service, psychology and sociology.

Other selections may be made to round out the program to produce a diversity of interdisciplinary exposure in the courses undertaken.

Off-Campus Courses

Courses are offered not only on the campus, but also at a wide variety of off-campus locations. The locations and hours of the courses are tailored to meet the needs of the students.

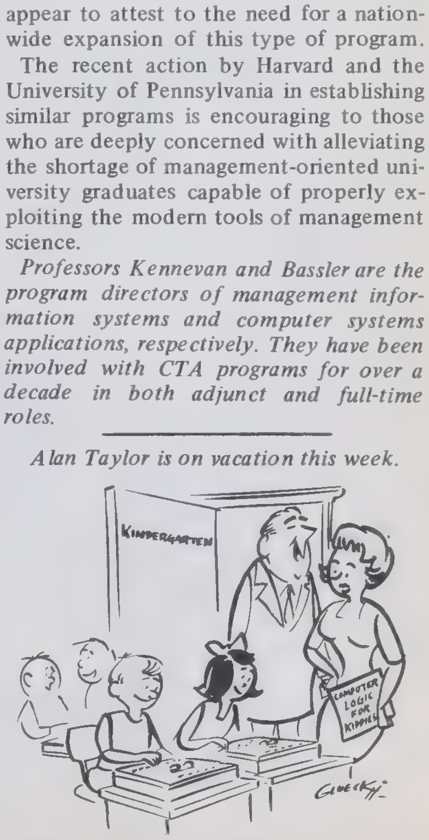
The CTA faculty consists of full-time members who are both skilled in the practical application of their specialties and academically qualified to teach their pertinent courses. This faculty is augmented with many adjunct faculty members drawn from the ranks of practicing professionals.

The comparatively large student body of the CTA at American University would appear to attest to the need for a nationwide expansion of this type of program.

The recent action by Harvard and the University of Pennsylvania in establishing similar programs is encouraging to those who are deeply concerned with alleviating the shortage of management-oriented university graduates capable of properly exploiting the modern tools of management science.

Professors Kennevan and Bassler are the program directors of management information systems and computer systems applications, respectively. They have been involved with CTA programs for over a decade in both adjunct and full-time roles.

Alan Taylor is on vacation this week.



'Never Too Early to Orient 'Em Toward Their Futures . . .'

'A Comical Sort of Tragedy'

Fourth-Generation Hardware Still in First Generation

By Arne Rohde

Special to Computerworld

Reader Commentary

The DP industry is normally proud of the fact that computer hardware is nearing or has already advanced to the fourth generation.

Certain parts of the industry can, of course, be prouder than others – but, when one part of it is still in the first generation, there should be cause for alarm or at least for doing something about it.

The earliest computers were coded in machine language. Soon afterward came the Assembly code which allowed mnemonics for the machine instructions, and, in some cases, allowed even for macro codes.

The next step was the design of high-level programming languages. With more users taking advantage of these languages, it was soon realized that standardization efforts were necessary within the field of high-level languages.

The latest step was learning to use these languages in the best possible way, whether it be with the aid of structured programming, modular programming, egoless programming or whatever.

There is one aspect of the development, however, which has remained dormant. Sooner or later a program has to be debugged.

Since we are not yet at the stage where we can write entirely error-free programs, test runs of programs are necessary. Some test runs are more fortunate than others, some even terminate normally. Others abort in some way or another. And what does a programmer do then?

Why, he produces a listing of the main storage in octal, hexadecimal or binary, in exactly the same way a programmer would on a first- or second-generation machine.

We then sit down with this machine code listing, trace our way slowly through the instructions and data areas and eventually hope to find the reason the program aborted. On a third- or fourth-generation machine!

Surely there must be a reason this is still being done.

Perhaps it is the easiest way of presenting the status of the machine at the time the program aborted, but only because no one has ever bothered trying to find out how an automatic analysis of an abnormal termination condition could be produced.

I cannot understand why an automatic analysis of abnormal termination conditions is not to be found in any advanced operating system. Perhaps it would take some time before the facility could replace the memory dump completely, but it should be possible with the present state of the art to produce a routine which could cover at least 90% of all terminations.

After all, the sequence of activities which a dump analyst goes through is fairly constant, dependent only on the type of error which caused the dump. The address of the instruction which caused the termination is found.

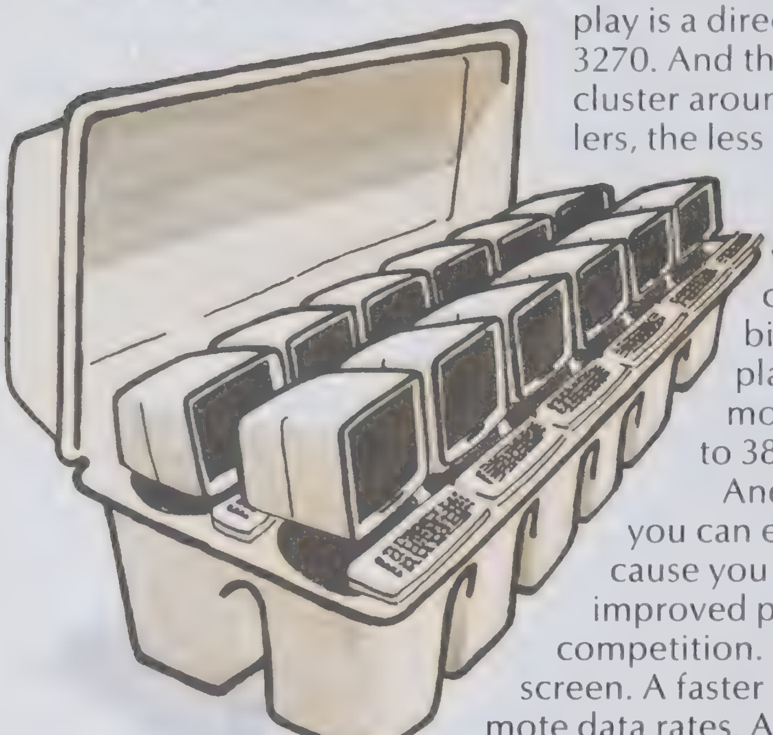
With a little juggling of addresses, the corresponding instruction in the program listing can be found. The contents of these operands are analyzed, and quite often the error is obvious from this information alone.

Would this be difficult to implement in the dump routine? Simply peanuts compared to many of the other operating system routines. And 50 pages of unintelligible printout is replaced by a single page.

But that only covers some of the possible cases. What about all the others? Admittedly, the procedure presented in the example is only applicable for certain types of error, but no matter what type of error caused the dump, there will nearly always be a certain sequence of steps which is followed to find the cause of the error. Surely a large proportion of these steps could be automated.

The articles and letters which have appeared in *Computerworld* from time to time describing the best ways to find your way around in IBM's memory dumps have amused me. To me, there is a comical sort of tragedy in the fact that the more advanced an operating system becomes, the more difficult it becomes for programmers to find the causes of terminations of their programs.

Please, vendors, by all means produce manuals which describe how to read and analyze memory dumps. But, at the same time, please try to automate the directions which are given in those manuals so that all except bit-pickers can avoid having to read them and learn them. After all, the fourth generation is on its way.



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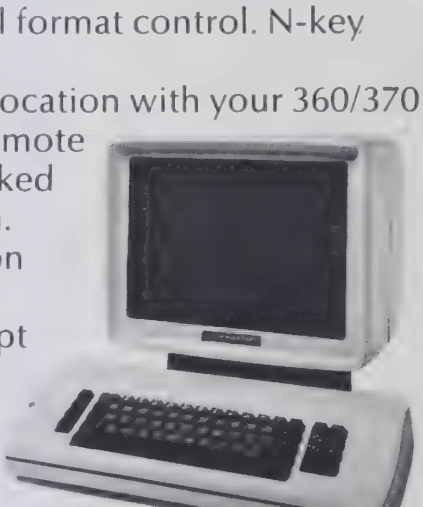

Letters to the Editor

Ways to Fail Not Needed

It must be difficult to find something to grosch about every week. Herb Grosch has now come out in favor of saying "No!", which is just what we don't need.

To begin with, only a tiny percentage of computer people are ever directed to do something unethical. Surely we have more important things to worry about. Let me suggest one.

Too many computer people already say "No!" They have refused to make systems usable by people, they have refused to become simplifiers rather than complicators, they have refused to apply their talents to improving the way machines are used by people.

If companies and government are to go forward, if society is to go forward, if the use of computers to assist humans is to go forward, the individual computer professional must say, "Yes, we can do that. Yes, we can make it better. Yes, we can solve it."

We don't need more ways to fail. Perhaps Grosch could suggest some ways to succeed. Alternatively, he might consider removing the white hat from his logo . . .

Ronald E. Jeffries

Ann Arbor, Mich.

DP Training a 'Potential Profit Center'— Not Luxury

Reader Commentary

By G.D. Horne Jr.

Special to Computerworld

We congratulate Gopal K. Kapur [CW, Feb. 26], for his excellent remarks concerning the inadequacy of DP training discovered in his survey of companies in the greater San Francisco area. He concluded, and rightly so, with a plea for management involvement and commitment to improved training.

It is our intent in this response to show that sound DP training, backed by continuous posttraining consulting, is a highly profitable venture for any computer-oriented business firm, and the key to this profitability is the wholehearted backing of top management.

Our organization is one of several facilities managed for the Energy Research and Development Administration (Erda) by major U.S. companies as a service to the government. Scientific computing and business data processing are integral parts of the successful completion of our contractual obligations.

For this reason, Erda officials and the directors of computing activities at each facility have joined together as a planning and policy body to stimulate high-quality performance in each computing center. This group has devoted a significant portion of its time to emphasizing the training needs of managers, programmers, analysts and operators in a cost-effective manner.

This commitment, backed at our specific facility by an allocation of almost 5% of the computer center budget, allows the training groups to execute a relatively broad professional development program. However, to make such a program successful, it is essential the training staff have the highest degree of credibility within the computing community it services. This means securing a staff recognized primarily for its professional computing skills and ability to deal with people, compensating that staff at professional data processing levels and developing each member's classroom abilities as necessary.

A method of staff selection which makes training ability the first criteria, and puts computer expertise second, will be counterproductive.

Having received the management commitment and having acquired top caliber personnel, the training group can show a corporate profit on the dollars invested in it. To show this profit, it must perform two basic functions not normally performed by trainers in the past — and must do them well.

Consulting Activity

The first of these is the consulting activity. In the past it was typical to see a programming class given and the student turned loose on an application assignment without further contact between the student and the teacher. However, having staffed the group with top computer professionals, we are now able to offer continuous follow-on consulting to programmers as they develop applications.

Further, with reasonable analytical effort, management can quantify the results of the consulting service in terms of dollars saved in the program development and debugging stages.

By the most conservative standards of calculating savings from consultation, results in one such consulting group showed a 100% profit on salary investment. Continuous consultation also points out to the staff where additional training is needed.

The second profit-generating service provided by this group is code optimization. By analysis of system-generated accounting data, it is relatively easy to isolate those production jobs which consume the most time or facilities on the object computer.

Working closely with the programmers and supervisors of these applications, the consultants review program performance with the assistance of commercially available software packages and recommend changes to reduce runtime and increase efficiency of facility utilization.

Results of these performance improvements are directly quantifiable, in dollars, on an annual basis, and in certain years have equaled the entire training group budget.

In a stable computing environment, code improvement will reach a point of diminishing returns and will be applied less frequently as a function of time. In growth periods, a sustained level of saving can be expected.

Management commitment, coupled with dollar savings from consulting and code improvement, creates a respect and acceptance of the training function so that the vital, but more routine, educational processes may be pursued with vigor. Among those features which have been implemented in this atmosphere are:

- Operator training courses on major computer systems, geared to reach each operator at least once each year and more often if necessary.
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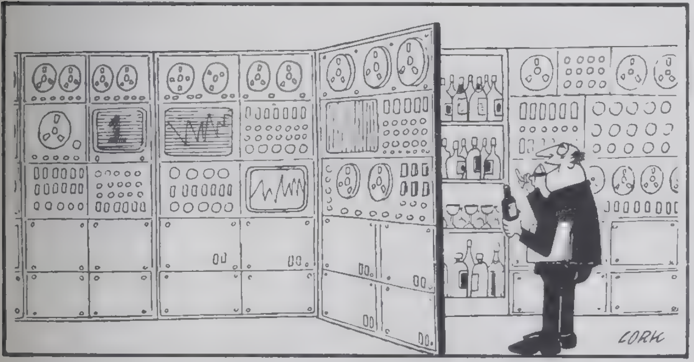
- A DP seminar series on topical material with eight to 10 sessions per year.
- User manuals and bulletins created in-house for the particular local environment.
- A full course schedule for programmers, analysts and supervisors in languages, structured programming and advanced techniques.

Computer training is not a costly luxury, but, rather, a potential profit center when staffed correctly and assigned money-saving responsibilities.

Horne is with the Computer Consulting and Training Division of Sandia Laboratories in Albuquerque, N.M.



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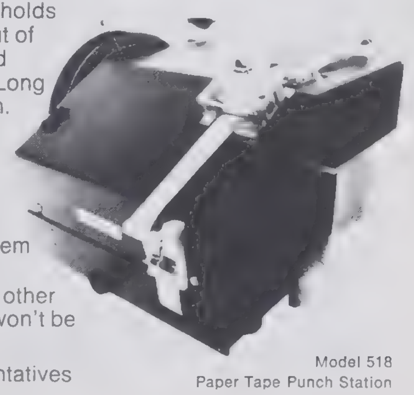

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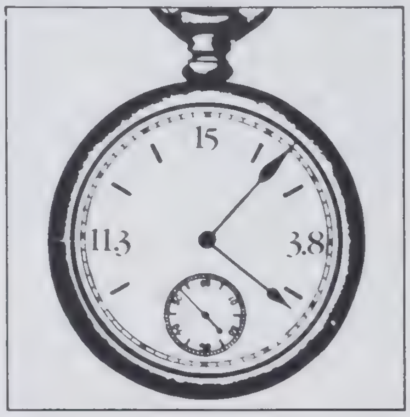

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Letters to the Editor

Wharton Not First or Only To Do Something About Gap

Just to set the record straight, I would like to make it known to my colleagues throughout the reach of *Computerworld* that the Wharton School was not the first and is not the only institution of higher learning attempting to span the management-technology gap [CW, March 12].

Although the approach of linking Information Sciences directly to the School of Engineering is somewhat more recent than the notion of pure Information Sciences as a body of knowledge in its own right, it too has been under way at many other universities.

For example, at the University of Pittsburgh both the School of Engineering and the School of Library Science have incorporated the study of information sciences into their curricula. Duquesne University in Pittsburgh has it incorporated into its School of Business.

Dean Donald C. Carroll was correct – massive waste does exist due to lack of understanding by both the manager and the technician. But like IBM, the Wharton School is not always the first and by no means the only.

David Klotz
Pittsburgh, Pa.

Source of the Problems

I think I have found the source of the numerous problems being endured by the U.S. railroad industry. According to a story in the March 12 *Computerworld*, " 'Train II' Pinpoints Cars of 67 Railroads," there are 200 million freight cars on 200,000 miles of track in North America.

That works out to 1,000 cars per mile of track – or an average length of 1.76 yards per freight car. Of course this figure is unrealistic, since it assumes complete coverage of the tracks by the cars and probably the average length is around 32 inches assuming only 50% coverage of the tracks by the cars.

This figure is a North American average and, since I know from personal experience that Canadian freight cars are much longer, the average U.S. freight car is around 21 inches long.

While I concede that compact size is popular in the auto industry, I think that the railway management is shortsighted in operating with so short a car. I respectfully suggest that, by lengthening the average car to 42 inches and cutting the number of cars to a mere 100 million, the industry can save 50% on cost of couplings and railway wheels and finally start on the long road to profitability.

Dr. Arnold Alberman
Willowdale, Ont.

You are right. The story should have read 2 million freight cars. Ed.

Case Options Five Years Old

While Harvard University and the University of Pennsylvania's Wharton School have recently introduced various programs in Management Information Systems (MIS) [CW, Feb. 26], the School of Management at Case Western Reserve University instituted such options at the master's and doctoral levels five years ago, and an undergraduate program is at the planning stage.

Unique to the MIS curriculum at Case Western is its breadth. Over 14 different courses are offered from three categories:

- Computer-based business data processing.
- MIS theory.
- MIS applications.

The emphasis in the above degree programs and courses is management – information requirements and services. The courses from the last category, for example, are oriented toward the design of information systems to support specific management levels and responsibilities.

Dr. Jeffrey A. Hoffer
Dr. Miles Kennedy
Dr. Heber MacWilliams
School of Management
Case Western Reserve University
Cleveland, Ohio

One Man's Solution

I take exception to Louis H. Gary's remarks [CW, Mar. 12] that "there is no such thing as a 'temporary library update' that can be used for testing."

I also struggled with this problem until last year when I discovered The Sorcerer, a source program library system from Marcus Powell Associates. This package permits temporary updates for testing macros and complete programs (in addition to permanent updates) for both OS and DOS.

Larry Payne
Brisbane, Calif.

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Esmark the Spot for 'Ramis'

Data Base Eases Calculations, Lets Financiers Plan

By Don Leavitt
Of the CW Staff

CHICAGO – Time and again, talks with users stress the importance of corporate financial planning as a computer-based function in support of management. But Roger T. Briggs, financial vice-president of Esmark, Inc., recently noted some companies mistake the process of measuring the impact of their plans for the planning process itself.

Describing Esmark's implementation of a planning capability based on the Ramis data management system from Mathematica, Inc., Briggs noted that successful planning requires three things. In addition to identification of the best set of alternatives for profit expansion, it must include the proper evaluation of those options, he said.

Finally, the process must allow estimation of the financial results of the proposed alternatives on individual investments and overall corporate impact. To manage these three tasks effectively, users have to be freed from the "detailed and time-consuming burden of calculating" the implications of their plans, Briggs added.

Chosen several years ago from among several packages being considered, Ramis is now providing Esmark's upper management with precisely that freedom during the six-month-long "annual planning" process. The system, supported by an on-site analyst from Mathematica, also permits inquiries into the data base, even if not directly related to the planning process.

Operating Companies' Participation

The system is working so well at the top level of the holding company, it is beginning to be moved down to the operating companies so their managements can follow the same basic practices as the leader.

Even now, the system permits participation of the operating companies during the planning cycle prior to the once-a-year corporate meeting. Ramis and its application programs allow the current users to report back to the companies and their divisions the up-to-date status of the plans.

Since the format of these reports can be tailored to the end user, they are more meaningful than they might be in the arbitrary form provided by some systems, an Esmark spokesman added.

These reports put out during the planning cycle can be extremely useful in keeping all concerned aware of revisions in data being considered at the corporate level. All division leaders should know, for example, if a particular division expects to experience a 10% growth, and Ramis provides the means of spreading that information, the spokesman said.

Once into the annual planning meeting, the top managers take advantage of the immediate response capabilities of the Ramis system.

They review material gathered to date and consider possible alternative plans. Technicians working with them can enter requests for new reports with newly proposed relationships between the various factors and have them to the managers the same day.

'What-If' Tests

Since the mechanics of getting the reports back do not get in the planners way, they are free to continue discussions of the broad sweep of events that may affect their corporate operations. They are free to run "what if" tests to determine the best of all possible plans.

"What if" has become almost a buzzword, without good clear definition, but in Esmark's case, Briggs suggested at least three types of situations that might be covered by the system.

Selection and modification of improvement projects is the most common use of the system. This might entail determining the financial impact of cutting a particular investment back in scope and funding several others.

Determination of capital investment limitations and earnings requirements focuses on planning to provide additional earnings while not exceeding available capital. Examination of alternative financing arrangements, the third basic "what if" situation, allows the managers to study ahead of time the impact of different balances of sources of cash.

CMS Programs Access DOS Files, 3340s Supported Under VM/370

WHITE PLAINS, N.Y. – Release 2 of IBM's Virtual Machine facility (VM/370), available now, includes remote spooling capabilities, 3340 direct-access storage facility support and the ability of Conversational Monitor System (CMS) programs to read DOS files.

In addition, VM/370 has been extended to include a measurement facility – showing current load conditions – and support for remote IBM 3270 CRTs under the same enhancements available for local 3270s, IBM said.

An extended interface between VM/370 and OS/VS1 is scheduled for release in May, a spokesman added.

The Remote Spooling Communications Subsystem (RSCS), a new VM component, permits multiple, remote spooling operations to run concurrently in a single virtual machine. Providing simplified operating procedures for supporting IBM 2770, 2780, 3770 and 3780 terminals as well as Hasp workstations and mainframes running under Hasp, ASP, JES2 and – in the third quarter – the JES3 programming components.

3340 Support Enhancement

The 3340 support enhancement permits the device to operate with greater flexibility than before when linked to a mainframe running under VM/370, the vendor said.

Formerly a 3340 was dedicated to a single virtual machine that controlled it through the operating system being used by the "machine." With the new support, a 3340 can handle a variety of additional tasks, according to IBM, including spooling, paging and providing virtual disk space.

The extended interface with OS/VS1 – when running under VM/370 – should allow users to eliminate many instructions and procedures redundant in a VM environment. This "hand-shaking" support should, in many cases, shorten the time needed by OS/VS1 to perform tasks in a VM/370 machine, IBM said.

Since VM/370 is a system control program, it is distributed free to any installation with the appropriate CPU. The enhancements are likewise free, the spokesman noted.

Controls Shape 'Symdata' Files

NEW YORK – Three types of control commands are used to define a test data file created on IBM 360 and 370 CPUs utilizing the Symdata package, recently introduced by Standard Data Corp.

Unlike some test-data generators, Symdata does not work from an analysis of data definitions within application programs. Instead, the first command identifies the characteristics of each field; the second, the record; and the third, the file itself, a vendor spokesman explained.

Optionally, Symdata provides facilities for the extraction of data from an input file and the use of logical capabilities in the definition of a field. Whether created from control commands or pulled from existing files, the test data file can be on tape, disk or card, Standard noted.

The generator allows the specification of 14 different field types, including data stored in packed-decimal, binary, zoned-decimal or floating-point form. Sixty-four different field definitions per record and 64 record types per file are also allowed, a Standard source indicated.

Symdata scans control information for syntax errors at input time, but also accumulates statistical information concerning the file generated. The file may be printed in character or in mixed-character and hex format.

The Standard package is available as a batch system under OS, OS/VS, DOS or DOS/VS or as a time-sharing system under VM/370's Conversational Monitor System (CMS) or OS's Time-Sharing Option (TSO).

Symdata can be acquired for a one-time price of $4,800, but lease and rental plans are also available from Standard at 1540 Broadway, 10036.

Feature Saves 'DYL-260' Space

ENCINO, Calif. – Dylakor Software Systems, Inc. has announced the availability of two special features for both the DOS and OS versions of DYL-260, the report composing/writing system.

One of these features is a data compression/expansion routine; the other is a positive-random-number generator.

Dylcomp compacts data records by removing strings of blanks or binary or packed zeros and substituting special characters during initial use; and restoring the original data from the special characters during expansion.

Compression can be done on fixed, variable and undefined records, the vendor said, and the feature might be particularly useful for compacting archive tape files or data being sent over communications lines. In some cases, compression can save 15% of the space – and time – needed to handle the data, Dylakor said.

Dylcomp carries a one-time cost of $225 or a rental cost of $9/mo, in addition to the cost of DYL-260 itself.

Dylrand provides the means of generating a positive random number in a four-byte binary format for DYL-260 users with the timer feature on their CPUs. The number generated by Dylrand "has a low reoccurrence factor" and "ranges between zero and 2 to the thirty-first power" unless a limitation is specified, Dylakor said.

The routine is self-relocating, requires less than 1K bytes of storage and is invoked by a DYL-260 Enter Linkage command. Dylrand is free except for a $25 handling charge.

DYL-260 itself rents for $80.60/mo "which is $2.60/day," the spokesman noted, from 16255 Ventura Blvd., 91436.

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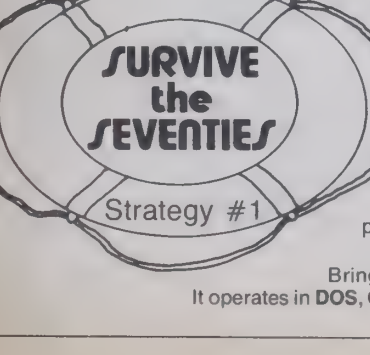

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Sequential Data Base Reading Featured in 'Adabas' Release

RESTON, Va. – The latest release of Adabas, the data base management system (DBMS) from Software AG, includes several added features and some enhancements to the internal functioning of the system, according to a vendor spokesman.

Already distributed to current users, Adabas Release 3.1.4 allows a data base file to be read in logical sequence by any key field starting with any specified value. This facility is said to be unique among the commonly available DBMS and means data can be extracted from files in requested sequence and without sorting, regardless of how it is actually stored.

Following a growing interest in data security, Adabas now allows a data base to be enciphered while stored, then deciphered while used, by a code unknown to the system itself. The user names the code that keys the enciphering and must reference the same code to restore the data to clear text.

Password security at the file and field level has been added to Adabas with this release, the vendor noted.

Since control is available at the field level, the access patterns can be shaped quite precisely. Personnel clerks, for example, might have general read-only access to employee records, but be completely locked out of even looking at current salary scales for management-level employees.

In the operational area, in multiple-user mode, Adabas now provides optional detailed accounting of CPU and I/O usage for each call to the DBMS. In addition, data protection checkpoints are synchronized with telecommunications and application checkpoints.

Adascript, the Adabas query language, has been enhanced, and the system's utilities have been updated to perform a complete range of data protection functions, the vendor said.

Adabas can be used in IBM DOS and OS environments with as little as 110K bytes of memory. It is available on perpetual license for $120,000 from 11800 Sunrise Valley Drive, 22091.

Library Maintenance A 'Slick' Function

ATLANTA – "Nearly all" the features of the two most widely used source program library maintenance systems at less than half the cost – that's the argument put forth by the vendor of the Slick package now available from National Computing Industries (NCI).

Slick is designed to provide IBM 360/370 users with program storage and maintenance; data set control and quick retrieval; and a program audit trail. Security, management control and backup facilities for disk-based operations are also provided, NCI said.

This library maintenance system is capable of supporting source programs, object programs, Job Control Language (JCL) procedure streams, data files and text. Slick is designed to use the capabilities of all IBM direct-access devices, including the 2311, 2314, 3330 and 3340, the vendor added.

Creates Working Copy

In operation, the utility creates a working copy of the stored program and the user is free to work with that without any danger to the original coding. Once modifications have been tested and proven satisfactory, they can then be incorporated in the stored program.

The system utilizes dynamic block allocation techniques as it recreates the basic library, and these eliminate any need for the user to reorganize it from the outside.

Slick can be used under either "real" or VS versions of DOS and OS. Several users may use it simultaneously from separate OS partitions; it may also be linked to run in any batched DOS partition, NCI said.

The package requires 44K bytes under DOS – "considerably more under OS" – and may be purchased for $1,950.

NCI is at 6075 Rosewell Road N.E., 30328.

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DP DIALOG

Notes and observations from IBM which may prove of interest to data processing professionals.

Containerized cargo is speedily processed for worldwide shipment at Global's Jersey City terminal.

Containerized Cargo Dispatched by Computer

Picture a shipping terminal filled with thousands of huge cargo containers. Some are stacked on trailer beds waiting to be picked up by truckers trying to meet tight delivery schedules. Others are being lifted by giant cranes from these trailers into a ship's hatch at the rate of one every two minutes. Hundreds of containers are moved from one location to another within the yard during each day.

Keeping track of over 100,000 containers a year is difficult enough. But at the 90-acre facility of Global Terminal & Container Services, Inc. in Jersey City, New Jersey, these containers are dispatched with ease all over the world. And the schedules of over 150 arriving vessels belonging to eight shipping lines are met each year. Despite the heavy traffic, individual containers can be located in a matter of seconds.

Global is able to accomplish this impressive organizational feat with the help of an IBM System/370 Model 135 computer which is linked to 12 on-line 3270 Information Display Systems located strategically at control points around the terminal.

"Each time a container is moved we must process information regarding its identification number, size, height, cargo, owner, final destination and location inside or outside the terminal," notes Thomas Minero, director of data processing at Global. "We could never handle that volume of data without the computer.

"The cargo-handling speed made possible by the container concept is much faster than manual paperwork or even batch processing can handle.

"For example, it is entirely possible for us to unload a container in the morning, empty it, dispatch it for new cargo in the early afternoon and have it reloaded on a ship by evening. Under these conditions, we need on-line computing to follow the cargo very closely," adds Minero.

When a trucker delivers a container, he gives all of its "vital statistics" to the person at the terminal gate. The information is passed to the command center where it is immediately entered into the computer's data base along with the drop-off location assigned to the container. It can be relocated for a later pick-up by keying in its identification number on a CRT. The computer also tracks the containers on the road and a printout "flags" overdue containers, charging the trucker on a per diem basis.

Some containers carry the smaller cargoes of several shippers bound for the same destination. In this case the computer calculates the cubic volume used by each shipper and bills him proportionately.

Finally, Global keeps a record of all documents necessary to clear cargo through customs. In the case of mixed shipments, several bills of lading may be needed for every container. A printout helps identify customs requirements of each.

"Great strides have been made in the efficient transfer of cargo," Minero says. "With the on-line capabilities of our Model 135 we can match that speed in processing our paperwork." IBM

Improved Application Development Pays Off At Marathon Oil

"Program maintenance time on new systems cut significantly . . . changes to new systems easier . . . systems kept more up to date . . . increased programmer productivity . . . more challenging job assignments."

Talk to the data processing people at Marathon Oil Company and these are some of the things you'll hear them say about their use of improved programming technologies.

Nearly two years ago, Marathon took the first steps to implement technologies such as structured programming, top-down development, HIPO (Hierarchy plus Input–Process–Output) design and team operations. Today they're standard procedure at Marathon's Findlay, Ohio dp complex.

"We wanted to make our programming easier to follow, revise and implement so our people could spend more time on new applications and less on routine maintenance jobs," says Wayne Sink, manager of Marathon's programming department. "With the improved technologies, we've been able to reduce time spent on maintenance of new systems. Now everyone has more time to work on challenging new applications."

At a structured walkthrough at Marathon's Findlay, Ohio headquarters, a knotty point is unraveled. Left to right are Marv Steckschulte, advanced programmer; Sharon Bonner, programming supervisor; Ralph Ellerbrock, senior programmer; and Martha Stearns, associate programmer.

The effect of the new technologies is to make programming development more of a science and less of an art, according to Sharon Bonner, programming supervisor. She became enthusiastic about the technologies following a presentation at a GUIDE open session in May, 1972.

"Structured design and programming, together with HIPOs, force people to think in terms of functions. Then their thinking becomes easier to follow and to implement," she says. "As a result, we can create project teams—ideally of three to five programmers—under the guidance of a lead programmer, whose assignments can be more or less interchangeable. Everyone can follow the progress of the project—it's all out in the open. This in turn makes possible periodic group reviews of work

(Continued on next page)

Advertisement

Dr. Bowman in Dow's thermal laboratory where many computer simulations are verified.

Problem Solving at Dow Chemical U.S.A.

As computers have become faster and larger, specialists in management science and operations research have been able to solve increasingly complex problems. Two areas in particular where the computer has helped extensively in recent years are optimization and simulation.

Optimization techniques are today applied to a broad range of problems, from refinery and animal feed blending to production planning and scheduling. Simulation methods are used in equally diverse areas, from the study of capital investment and inventory systems to the analysis of consumer behavior.

One organization that is effectively applying these and other problem-solving techniques is Dow Chemical U.S.A. "This has been possible to a large degree because of Dow's Computation Research facility at Midland, Michigan," says Dr. Carlos Bowman, Research Director.

"It was formed in 1956 to help make better use of its computer capabilities and to fully exploit the potential of data processing in research and development. Since then, it has become the center here for problem-solving assistance."

Dow's research facility uses an IBM System/370 and a large library of advanced computer programs designed to solve a range of problems, from data retrieval and statistical analysis to optimizing mathematical models. Such programs as the General Purpose Simulation System (GPSS), the Continuous System Modeling Program (CSMP) and the Mathematical Programming System Extended (MPSX) have all played an important part in solving complex problems at Dow.

Problem solving within the Computation Research facility is the main concern of the Mathematical Applications Group, headed by Dr. Richard Klimpel. Says Dr. Klimpel: "We want to promote better decision-making by using mathematical methods. We can do this with the help of the computer."

Recently, the group used GPSS in evaluating the market potential of a new industrial chemical which, it was hoped, would displace competitive products. The problem was in seeking an expanded share of an established market, rather than creating a new one.

The evaluation, which took only a few days, would previously have taken several weeks of programming effort, according to Dr. Klimpel. "But with GPSS, we quickly formulated a straightforward simulation model containing a combination of deterministic and random elements. The model made it possible to qualitatively predict the effects of marketing decisions and to answer key questions about the marketing organization, the pricing policy and the production facilities that would be needed to meet the marketing goals on a financially sound basis. GPSS proved to be a real timesaver."

When it comes to dynamic simulation, the mathematics group uses CSMP. "With CSMP we can 'build' a part, a piece of equipment, or a complete system within the computer," says Dr. Klimpel. "We can 'create' a product, a process or an environment. Then we can observe performance in terms of time and varying conditions. We can modify, re-evaluate, and optimize—all within a time span measured in hours and without any investment in manpower development or money."

Other problems confronting Dr. Klimpel and his staff include linear programming, which he explains is helpful to plant managers in pinpointing the most profitable product mix, as in setting production levels to optimize the use of available raw materials. MPSX enhances linear programming approaches by simplifying problem structuring and solution formation.

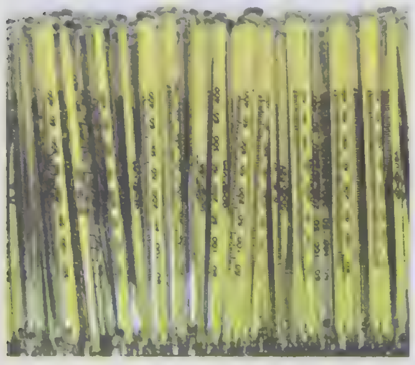
"Technological growth is a way of life here," he emphasizes. "With the help of computer analysis, we can grow at a faster pace. IBM Program Products have contributed because of their versatility and availability. With them, we are solving important problems with a degree of timeliness and accuracy that was not possible before." **IBM**

Computers Help Make NASA Technology Available

"What's the most suitable ceramic ink to bake on a thermometer—and how should we work with it?"

That's the kind of question that NASA—the National Aeronautics and Space Administration—might have researched at some time in learning to fly men to the moon. The Space Act of 1958, which created NASA, required that its technological discoveries be made available to the public. As a result, non-restricted NASA data has been entered into computers at six nonprofit industrial applications centers across the country.

One of them, part of the University of Connecticut at Storrs, is the New England Research Application Center (NERAC), established in 1966. In addition to NASA material, the center's IBM System/370 Model 115 computer also stores data gathered by numerous technical societies, adding some 100,000 new items each month. A staff of specialists in various fields of science and engineering responds to requests, which are accepted from fee paying industrial clients and from state and local governments.



The scale and degrees are baked in ceramic ink on these H-B industrial thermometers.

For example, a specialist in chemistry discussed the question quoted above with the client, H-B Instrument Company of Philadelphia. Then he worked out a retrieval strategy involving a search of two million items in the NERAC files. In total, the computer ran nine major searches on related questions and produced a list of 200 relevant documents; about 25% of them came from NASA research.

Having first sent the list to the client, the specialist then borrowed the desired documents from the libraries indicated by the computer (some papers were at the extensive University of Connecticut library itself) and forwarded them to H-B Instrument. They provided precisely the information the company wanted in order to simplify its production process.

"The NERAC data enabled us to eliminate five manufacturing steps and thus double our output of thermometers. If we had done the research on our own, the costs would have been prohibitive," reports Edward Hiergesell, secretary of H-B.

NERAC is part of the University of Connecticut at Storrs, Conn.

Virtual storage and multiprogramming on the Model 115 have made possible enlarged and expedited data searches, according to Dr. Daniel Wilde, director of NERAC. "We can be doing a search for one company and simultaneously be updating the data base, editing, and printing results for other clients.

"We encourage our clients to ask as many questions as possible, so if one approach fails, another might be productive," says Dr. Wilde. "This is feasible because the Model 115 is dedicated to this application and we take advantage of its advanced capabilities." **IBM**

Improved Application Development At Marathon Oil...

(Continued from first page)

accomplished, called walkthroughs."

And Ralph Ellerbrock, senior programmer, cites the reduced time to code and debug a program as a major benefit.

"We used to work from the bottom up—we'd start with the leaves of the tree, so to speak, and work back along the branches to the trunk. This involved cumbersome testing and integration devices that ate up valuable programmer and computer time.

"Now we use top-down development. We begin with the highest levels of logic, those that govern the program as a whole, and work down to the more detailed segments. This allows us to implement and test in stages, at the same time that we are coding. It's a far more efficient way to work."

Six Improved Programming Technologies

IBM and other organizations use improved programming technologies in their development work. The technologies can be used separately or in any combination, although maximum benefit will probably be realized by using all of them together.

1. *HIPO documentation* is a design and documentation technology. Using HIPO throughout the development process, documentation is produced as a by-product, eliminating the need for later documentation.
2. *Top-down development* imposes an architectural discipline on the sequence in which code modules are written, following previously identified functions. It reduces integration testing difficulties and promotes more orderly system development.
3. *Structured programming* does for programs what sentences, paragraphs, pages and chapters do for books—makes them easier to read and understand. This allows other programmers to maintain them and modify them with greater facility.
4. *Team operations* is a concept which assigns a team to each project. The team usually consists of a chief programmer, a backup programmer, a librarian and additional programmers and analysts as needed. This permits better definition and assignment of responsibilities, facilitating job interchanges.
5. *Structured walkthroughs* are conferences or reviews conducted by groups with the same objectives, but excluding management personnel. They are intended to analyze design, detect errors, develop test strategies and promote the interchange of knowledge and viewpoints.
6. *A development support library* is controlled by a librarian who assumes the administrative and clerical tasks now imposed on programmers and managers. It provides up-to-date information on programs and test data as they are developed, both in computer-readable and human-readable form.

DP Dialog appears regularly in these pages. As its name suggests, we hope DP Dialog will be a two-way medium for DP professionals. We'd like to hear from you. Just write: Editor, DP Dialog, IBM Data Processing Division, White Plains, N.Y. 10604.

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'Autoflow II' Feature Creates Documentation at System Level

PRINCETON, N.J. – IBM 360/370 installations using Autoflow II can now extract and compile system-level information for DP departments and end users with the Automated System Charter (ASC) option recently introduced by Applied Data Research (ADR).

Released several years ago as an outgrowth of ADR's original Autoflow flowcharting package, Autoflow II is described by the vendor as a program analyzer/auditor and text processor. It still produces program-level flowcharts, but also includes a Cross Program Auditor to integrate and examine all programs within an application system.

ASC goes further. It is a "systems communicator" which relates external activities – such as manual, user-department procedures and computer-room actions – to application systems, according to an ADR spokesman.

The option relates data entities to the machine processes which access, modify or produce them; it determines and presents data requirements of overall computer operations over a period of time.

"It presents a complete picture of all the jobs, processes and data involved," the spokesman said.

ASC examines Job Control Language (JCL) statements actually used to run production systems. Supplemented by procedure library and catalog information, JCL typically contains most of the detail needed to generate the ASC charts and reports, ADR said, but a System Chart Language enhances the extraction process.

User-selectable output includes a system chart, which diagrams the relationship of jobs, processes and data entities, and a system report, which presents the same information in tabular format. Job and process reports provide indexes of jobs and their processes (programs) and of processes and their related data elements.

A system logic chart diagrams the processes of a system in terms of the decision logic which determines whether each process will be executed.

The ASC option is available on a permanent license to DOS Autoflow II users at $3,740 and to OS Autoflow II users at $4,290, ADR added from Route 206 Center, 08540.

Package Ties Bank, ACH

HARTFORD, Conn. – Commercial banks can interface customer files and an automated clearinghouse (ACH) for electronic transfer of funds with the Paperless Item Processing System (Pips) from Financial Industry Systems.

Pips is written in Cobol and is compatible with all major manufacturers' operating systems, a spokesman said, adding that it processes ACH transactions either as an originating or a receiving bank.

Specifically, Pips accepts input from the ACH or correspondent banks as a receiving bank or accepts input from companies or correspondent banks as an originating bank. It edits and controls inputs to ACH standards, but error and reject decisions as an originating bank may be customized.

Pips also routes foreign items to the ACH or directly to correspondent banks with an option to produce paper documentation for non-automated banks. It supports retention of transactions under accounting control until processed and cleared for the correct settlement date.

The system also provides for item or batch deletions with appropriate audit controls, maintenance of complete volume statistics by source and destination of input and maintenance and control of a prenotification file for all "on-us" transactions.

The system requires a minimum interface with demand deposit (checking) and savings account applications at the using bank. It requires 60K bytes of memory, two tapes and two disks to operate with IBM DOS.

Pips is available under two license options: an initial fee of $1,000 plus annual charges for transactions processed and maintenance; or a fee of $7,000 with no transaction charge and an annual maintenance fee.

Financial Industry Systems is at 150 Windsor St., 06115.

Codon 'DMS' Gains Transmission Links

BEDFORD, Mass. – The minicomputer-based Distribution Management System (DMS) installed on a turnkey basis by Codon Corp. has been extended to include communications software and interfaces with other DP systems.

The enhanced capabilities permit any Codon system to communicate – without operator intervention – with public warehouses via Western Union's TWX network. The system does all the work, automatically dialing the teletypewriter at the warehouse and transmitting everything needed to pick orders from stock on hand there, Codon said.

Field tests have shown that by eliminating the operator, the system has "dramatically" improved turnaround time in processing orders and saved transmission time and line costs as well, the vendor claimed.

In addition to working directly with teletypewriter-equipped warehouses, DMS now has the facility to interface with IBM CICS-based 360 or 370s, Mohawk Data Systems 2400 units, Computer Machinery Corp. data entry equipment and Four-Phase business DP systems.

Codon uses standard binary synchronous communication techniques, a spokesman noted.

Applications in a Codon DMS installation may include order entry, order processing, invoicing, billing, receiving, picking, shipping and management reporting. Since each system is customized, costs vary and cannot usefully be quoted even in general terms, the company noted from 11 De Angelo Drive, 01730.

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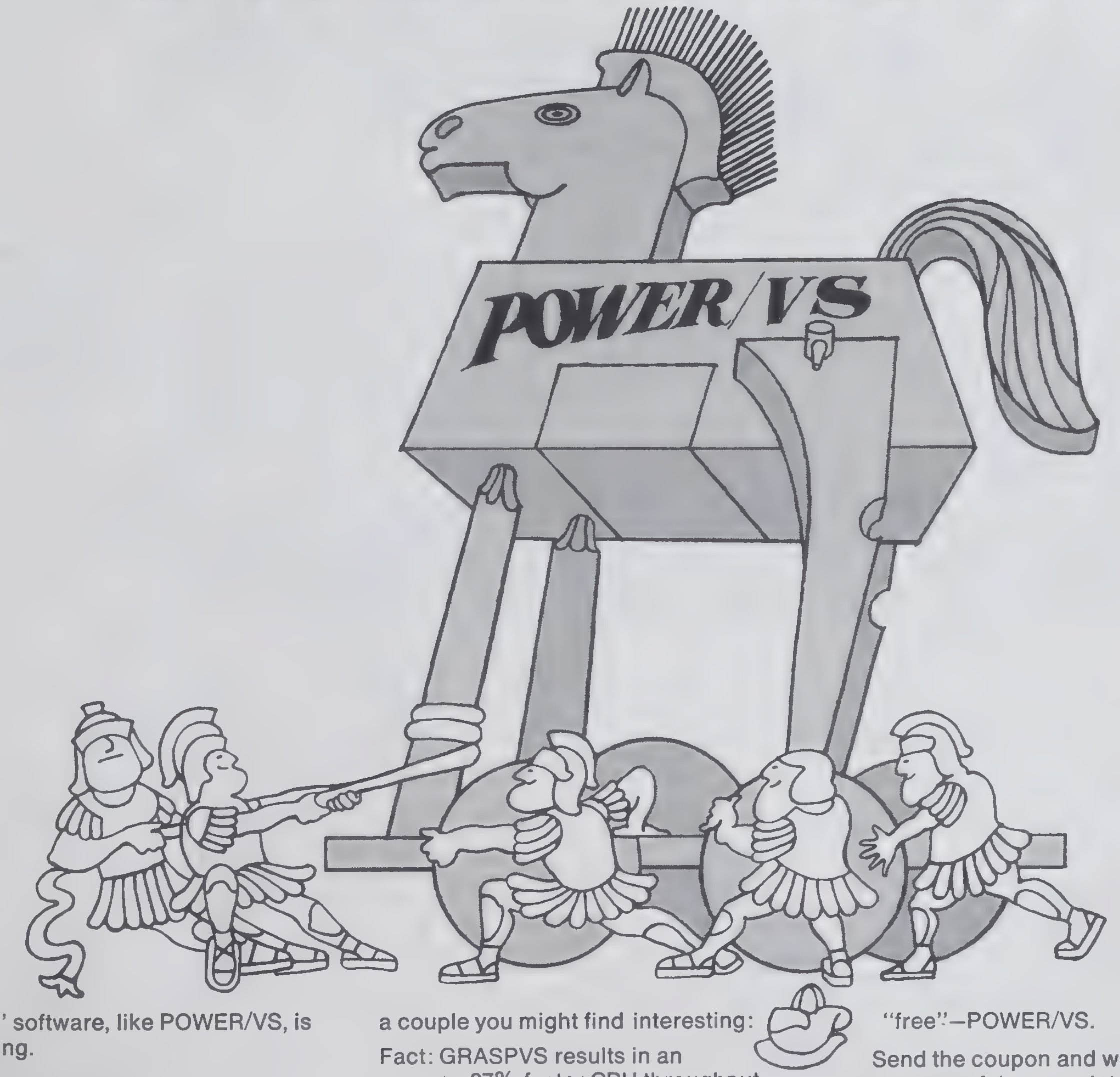

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Niagara Mohawk Reports

TSO Cuts T/S Costs, Aids Programmer Productivity

By Robert J. Brunner
Special to Computerworld

Niagara Mohawk Power Corp. (NMPC) was the first utility to use IBM's Time-Sharing Option (TSO) software, ordering it in 1973. Basically, our experience has been positive.

TSO is now in place under OS/VS2, linking a local network of 45 IBM 3270 information display and IBM 2741 data communications terminals to two 370/158s at the company's Syracuse, N.Y., headquarters. We save more than $10,000/mo compared with the cost of using outside time-sharing for engineering applications.

But engineering is only one of eight departments and 20 functional areas realizing the benefits of computer time-sharing.

The DP systems and programming section makes the most extensive use of time-sharing for normal program development and maintenance.

TSO has proven so successful that it has been extended to 170 qualified users throughout the company. It is available from 8 a.m. to 6 p.m. daily, and as many as 33 people can use it at once.

During the day one of the 370/158s is dedicated to time-sharing. Like most utilities, NMPC uses computers heavily for second- and third-shift batch processing.

The company cycle-bills 50,000 customers a day from data not available until after 4 p.m. That makes prime shift ideal for TSO use.

Engineering uses TSO for fast, scientific problem solving and for programming support of batch applications. NMPC uses four 3270 terminals more than 90% of the time on prime shift. Problem-solving applications range from voltage profile studies and fusing analysis to voltage regulator analysis and transformer aging.

"Productivity is four times that of straight batch mode," Rufus Burlingame, manager of engineering methods, explained. "Every engineer used to write his own programs. Many applications overlapped, resulting in duplicate effort. Now we have a menu of programs to choose from and terminals nearby to use."

Simulates Line Outages

This kind of access pays off in a number of ways. If the electric operations department wants to take a line out for maintenance, the effect can be simulated using TSO. Load flow changes also can be simulated through TSO.

NMPC's Buffalo and Albany engineering groups submit, via TSO, work to be processed on the 370/158 in the batch mode. Before TSO, they sent the work through the mail or used an outside time-sharing service.

A history file selectively accessible from TSO terminals spells out the date, time, location and duration of interruptions in NMPC's service system. Useful for evaluating performances on company equipment, the file can be accessed to find out how long any particular piece of equipment has been out of service or even where we should trim trees. Before TSO, this kind of information was hard to obtain.

DP Staffs Helped

In addition to engineering, TSO also aids normal computer systems, programming and operations activity. In-house debugging is a major use for new programs as well as normal maintenance. Productivity is the key benefit here – faster turnaround in almost any kind of system analysis or programming activity.

"Productivity is up 30% to 50% in our area," according to Ray Heuring, manager of DP systems and programming. "We used to require three to five programmers for each analyst. Now that number is down to one or two."

Everything is done on the terminal. With interactive Cobol, Assembler and Fortran debug features, the programmer can look at data at any point in a program, loop through routines several times and see what's happening.

Tables, such as those for vehicles, names, types and styles in company transportation, can be called in under the edit function to simplify changes in programs. Under the old system, the company might have had to update three or four programs for simple changes.

One of the big advantages of TSO is that the user is not controlled by computer operations scheduling. NMPC had a deadline recently that called for as many as 30 program tests in one day. The most obtainable in normal batch submission is four a day, so TSO had seven or eight times the value.

Developing new programs and program maintenance are both easier. Recently, we converted a large number of programs to run on our computer. A certain amount of logic had to be changed.

Functional differences between programming languages were changed right on the terminal, and the entire process was completed in two months. It would have taken two to three times as long without TSO.

The contrast between old and new is just as sweet for the coordinator of technical activities and his technical support group. The basic use of TSO here is in monitoring and maintaining the operating system.

"The major advantage is faster turnaround," Harry Schisler, coordinator of the section, said. "Every change to the hardware or software at Niagara Mohawk means work for us.

"Before TSO, all changes were entered with punched cards. Now they can be entered on 3270 terminals. We can maintain OS/VS2 easier and faster, and we can implement any new software releases much sooner," he added.

Brunner is director of information systems at NMPC.

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Study of N.Y. Telephone Finds

Data Sets Most Concentrated Area of Interconnection

By Ronald A. Frank
Of the CW Staff

ALBANY, N.Y. – At the end of 1973, 27.7% of the data sets installed in areas served by the New York Telephone Co. were customer-provided devices. This made data sets "the most heavily penetrated" area of interconnection, according to a report by the New York Public Service Commission (PSC) staff.

The report was undertaken by the PSC to evaluate the impact of interconnection on the facilities and revenue of New York Telephone and covered the time period from 1970 to 1973.

At the end of the period, the phone company had lost an estimated $1.9 million in rental charges due to the interconnection of non-Bell data sets by users. But this figure was offset somewhat by the $215,000 which the phone company received due to rentals of Data Access Arrangements (DAA), the report said. The DAAs are required on each dial-up line using a customer-provided data set.

At the end of 1973, the phone company had 11,651 data-set customers while 4,471 users had selected non-Bell modems along with the required DAAs. The PSC staff estimated the switch to independent modems caused a displacement in Bell plant equipment totaling $3.4 million. This is the Bell equipment that had to be changed to other locations or taken out of service when customers installed independent modems.

During 1973, New York Telephone reported 9,507 trouble calls were found to be caused by independent data sets and said detection of these troubles took an average of 2.21 hours at a total cost of $425,430.

Customers paid $210,390 of this cost, the report said, assuming the phone company billed users for these trouble calls. "Such a mismatch of cost and revenue should not be subsidized by the company's noninterconnected subscribers," the report said, adding rates should be raised for these trouble calls.

The phone company did get some benefits from the independent modems because it saved an estimated $794,000/year on maintenance, billing and other functions which it no longer had to provide, the report said.

But the PSC staff took issue with New York Telephone claims that it had to increase its advertising, marketing and sales costs to counteract the effect of increasing use of non-Bell equipment. The phone company said these added costs amounted to $71,700 in 1973, but the report called the figure "extremely specious."

Although the growth in non-Bell data sets appeared to slow down somewhat in 1973, the report said it was difficult to project what would happen in this area through 1984. The report concluded that, for "each one-dollar reduction" in phone company revenue as a result of interconnection, other users would have to absorb a 32-cent annual increase.

DEC Preprocessor Handles Protocols

MAYNARD, Mass. – A synchronous communications preprocessor with a throughput rate of up to 38.4K char/sec has been introduced by the Digital Equipment Corp. Group.

Designated the DV-11, the preprocessor unit is available in eight-line and 16-line versions and is designed for use with DEC's PDP-11 family of computers.

The DV-11 is based on a special-purpose microprocessor developed for data communications functions. The preprocessor is designed to relieve a PDP-11 central processor of as much as 95% of the processing overhead in handling communication protocols in a multiline environment, DEC said.

Direct memory transfers are used for both transmission and reception; the DV-11 supports full- or half-duplex synchronous transmission up to 9,600 bit/sec.

Typical applications for the DV-11 include connecting a PDP-11 to remote batch terminals, buffered display terminals or other computer systems in a network. The preprocessor can be used either with stand-alone systems or with CPUs used as front ends to larger processors.

The DV-11's special-purpose microprocessor acts as a front end to the minicomputer, relieving it of most of these chores, the company said.

With a hard-wired interface, the user is normally restricted to a single protocol; to handle different protocols, additional hard-wired interfaces would have to be purchased. By contrast, the DV-11 can be programmed easily to handle different protocols simultaneously and costs less than hard-wired devices, a DEC spokesman said.

To protect against data overruns, the DV-11 has a 128-character first-in/first-out receive buffer.

Priced at $7,100 for an eight-line unit and $10,200 for a 16-line unit, the DV-11 is scheduled for delivery beginning in July 1975.

In Bank's Selection of Terminals

Research, Pilot Testing Determine Customer Needs

By Patrick Ward
Of the CW Staff

NEW YORK – How does a bank effectively select terminals during a period of dynamic change?

The Chase Manhattan Bank here found it takes research and pilot testing to ascertain future customer needs, according to Donald Hollis, vice-president of the bank.

Chase decided it should interface with all emerging technologies and that it had to complement – and not obsolete – the previous telecommunications investments of its customers, Hollis told recent Computer Caravan attendees here.

Chase provides retail and wholesale financial services through extensive networks of branches, affiliates, correspondents and subsidiaries, Hollis said.

Traditionally, banking automation focused on large "back office" batch systems, but today's price/performance breakthroughs in the DP and communications industries have presented banks with revolutionary alternatives to meet customer requirements, he said.

But all these alternatives raise the question of standards, since the financial services industry differs from most other businesses in the degree to which it is regulated and in the large number of intercompetitor (bank-to-bank) transactions that take place, he explained.

Interfacing with the Federal Reserve system must often be done on its terms, he pointed out, and interfacing with competitors is done cautiously so proprietary advantages which often cannot be effectively patented or copyrighted will not be lost. Antitrust legislation also limits cooperation with competitors.

These constraints tend to slow down the adoption of standards, thus withholding from all competitors the cost benefits that mass production of financial service terminals could bring.

Financial institutions are often reluctant to commit themselves to a given access method for fear it might be obsolete once a standard is agreed upon, he added.

React to Success

Given all these factors, some financial institutions have developed a policy of not investing in terminals, but observe the success or failure of others and react to it, he said.

Some institutions are entering the terminal development and manufacturing business themselves. Some cooperative efforts (such as the Cope and Scope clearinghouses in California and Georgia) have followed, he noted.

However, Hollis stated, it appears many of these efforts have tended to be too self-serving because they provide benefits essential to the financial institutions involved and not directly to their customers. This lack of marketplace responsiveness may have led to the low volume of demand on the California and Georgia clearinghouses, he said.

Chase took the view that success comes from satisfying customer needs, Hollis said. "First we concluded that the pace of introduction of terminal-based products must be tied to the rate at which our customers were ready for them."

Chase also favored a "menu-type approach" to help its customers make a transition at their own speed, he added.

Chase studied what its customer's future needs and wants would be. It found customers were satisfied with many currently offered services because they met present needs and the customers felt they would be available at the same relative price in the future.

Chase's research then indicated the bank's on-line terminal investment had to handle both traditional products in paper form and electronic debit and credit card-originated transactions, Hollis said.

And ". . . in light of the continuing stream of new terminal offerings we have also invested in upgrading the terminal environment in the discount store operated by our employees' club. This mini version of a department store has been double- wired as an R&D investment so that we have a live test bed in which to conduct true comparative evaluations on new vs. old terminals," Hollis said.

The overall results of the Chase studies showed a demand for three families of terminals; retail, emphasizing both branch and point-of-sale; wholesale, emphasizing cash management and money transfer; and multimarket, accessing wholesale, retail and internal information.

"Further, we've learned we must have universal interfaces to interact with customer computerized systems and to provide basic added value to their own terminal investments (supermarket electronic cash register – laser scanner systems)," Hollis said.

Rather than supplement existing customer terminals and lines, Chase first attempted to interface with them, he said.

Finally, "security and integrity are functions customers have come to expect from the banking industry," Hollis said.

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The AJ630 is a solid state, non-impact printer terminal that has a lot to offer— • speeds up to 30 cps • prints 140 characters to a line • holds a 15", 400' roll of paper • provides all 128 ASCII characters • two character buffer, plus options such as internal modem for DAA or acoustic coupler. There's a lot more in our 4 page brochure, it's yours for the asking.

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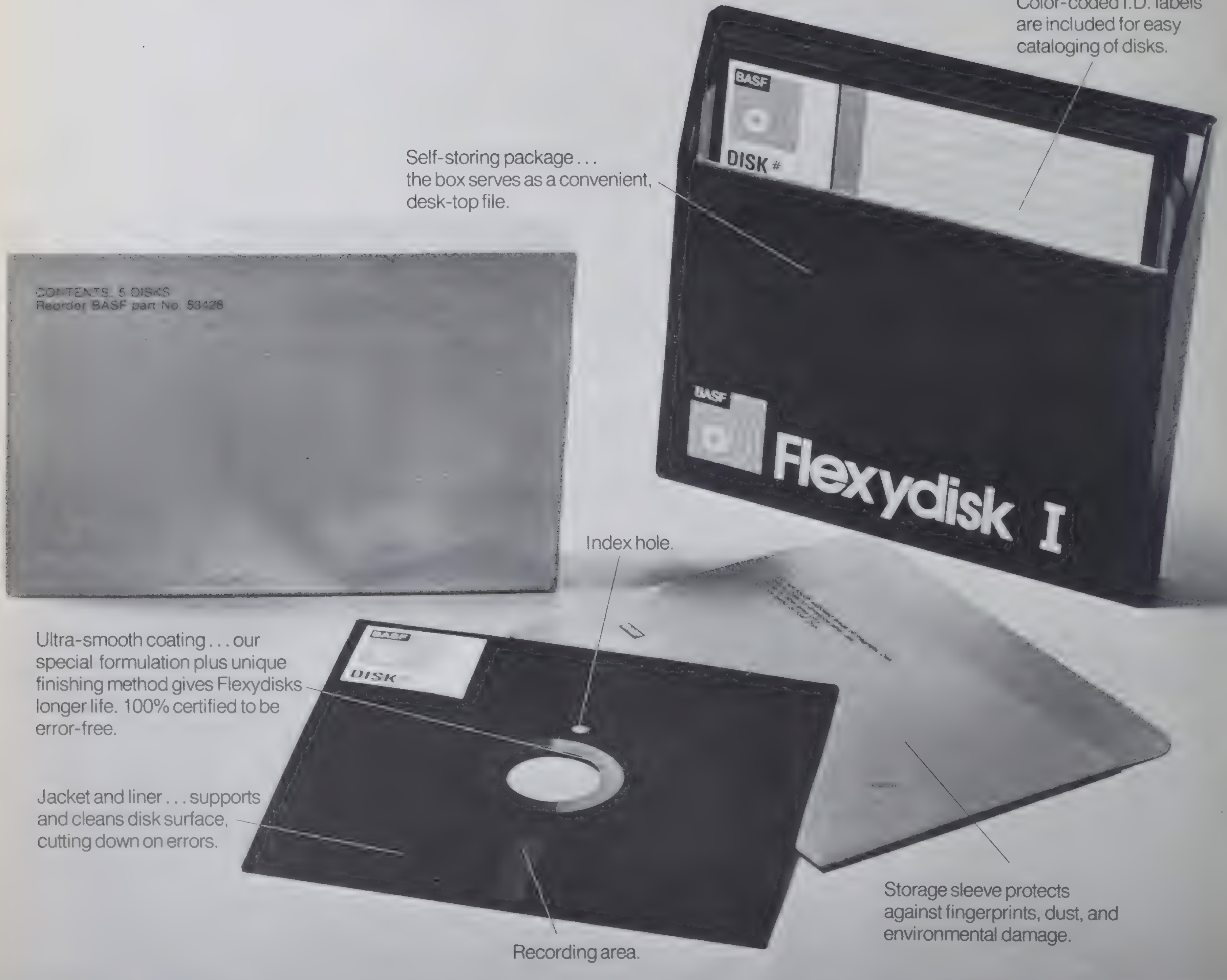
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Airline Writes Teletickets Using Terminal Network

Special to Computerworld

The concept of transmitting airline tickets to commercial accounts and travel agencies is not new. The practice, which uses a teletypewriter receiver for teleticketing acceptance, has been in use by the industry for some 15 years.

What is new is United Air Line's expanded ticketing capabilities which completely automate the teleticketing process. Under the previous method, all preparation to transmit a teleticket was through extensive manual action.

The request for a teleticket by an account required key-entry preparation of a ticket facsimile. This was converted to punched paper tape and then transmitted using dial-up Bell lines.

In September 1974, United introduced a method which connected these receiving devices to its central reservation system, Apollo, stored on an IBM 370/195 in Denver.

Through the automated reservations program, a passenger's itinerary is stored into the Apollo system. Apollo can then be commanded to format a teleticket, establish the correct price using some 380,000 airline fares stored in the system, dial the ticket receiving terminal (a receive-only Teletype Model 28) and print the teleticket in the customer's office.

This activity results in delivery of a teleticket within five minutes of the customer's request. The system also has the capability to store future teleticket requests which will automatically be delivered at predesignated time periods requested by the customer. During a batch transmission period the program has the capability to insert a rush priority ticket.

This method completely automates the entire teleticket process and eliminates all time-consuming manually operated steps. The ticket information is transmitted at 75 bit/sec.

Apollo is currently serving some 1,200 teleticket account locations with approximately 58,000 teleticket/mo.

Specialized Hardware

To accomplish the functional requirements of the automated teleticketing application, United required some specialized hardware. Computer engineers investigated the many hardware alternatives and decided special communication microprocessors, located at the Apollo Computer Center in Denver, accessing outgoing Wats lines would be the best approach.

United selected the microprogrammable Icot 108 from Icot, Inc. as the main automated teleticketing device because it conformed to the special high-speed line discipline inherent to IBM's Programmed Airline Reservation System (Pars)-type reservation systems, was modular (one high-speed interface accessed up to three low-speed lines) and contained read-only memory (ROM in the program section which negated the need of having to load the program in case it was destroyed.

Terminal Transactions

The Icot unit accepts outgoing teleticketing messages from the Apollo system (operating under Pars line protocol), buffers these messages, extracts the phone number, establishes the connection via Wats lines to a remote auto answer Model 28 read-only teleprinter with ticket stock, converts from Pars' Sabre code to Baudot code and then outputs the message to be printed.

An acknowledge message is then generated back to the Apollo system indicating that the teleticket has been processed.

Vadic Units Picked

Vadic automatic calling units and 305 modems were selected for the low-speed lines because they are modular (up to 8 modem/dialer combinations in a rack), had diagnostic indicators, redundant power supplies and contained a tandem dialing option. Touch-tone Vadic 801CC dialers were used to speed up the connect time to the remote Model 28 printers.

United's hardware engineers also developed a special Port-Sharing Device (PSD) which allowed the Icot 180s to share a computer port with other IBM 2915 CRTs.

The PSD connects with an IBM 2969 programmed terminal interface, which is a modified 360/44, and acts as a front end to the Model 195. The ticketing system uses seven Wats lines with six dial-up lines for overflow.

Tran Adds Synchronous Data Sets

EL SEGUNDO, Calif. – Computer Transmission Corp. (Tran) has introduced two synchronous data sets for service in twisted-pair facilities.

The Intertran Model 951 serves terminals of varying speeds up to 19.2 kbit/sec, and the Intertran Model 956 operates with high-speed terminals or in computer-to-computer transmissions at rates up to 230.4 kbit/sec over distances up to 15 miles via four-wire, twisted-pair lines.

The units incorporate a variety of advanced performance features, including a patented pulse modulation scheme that reportedly produces the best error performance in point-to-point links.

This modulation technique is said to provide greater immunity to impulse noise on a circuit and eliminates requirements for equalization. Both Intertrans feature local-loop and remote-loop test and fault indicators for identifying open circuit failure conditions.

The devices are available in submodels with switch-selectable data rates ranging from 2,400 bit/sec to 19.2 kbit/sec. In addition, the Intertran Model 951A is modulated to meet Bell metallic specifications for output power levels at data rates up to 9,600 bit/sec.

Either model can be obtained under terms of Tran's 30-day rental plan for $57/mo for the Model 951 and $80/mo for the Model 956.

Purchase prices are $895 for the 951 and $1,195 for the 956 from 2352 Utah Ave., 90245.

An Elgard UPS will keep your computer operating in the black.

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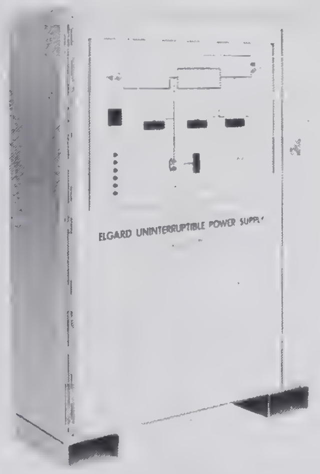

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So warehouses, insurance companies, large EDP users, banks, and companies with many branch offices may find the 310 the most important new system in years.

It includes a PDP-8A CPU with 16K characters of core memory, a VT50 CRT (960 character display) with full keyboard and numeric keypad, operating software, and a dual floppy-disk drive to store 670,000 characters.

You can expand up to 64K characters of memory and up to 1.34 million characters of disk storage. You can add printers with speeds of 30 cps, 165 cps, or 300 lpm; and a 2780-compatible interface for communications.

COS 310 software provides tools to develop and run an efficient system. DIBOL language serves for higher-level business programming, and a full complement of utility routines can handle file management and report generation.

To some users it will be the ideal RJE station. To others it will be a brilliant terminal at a cost lower than a smart one. For still others it will be the stand-alone computer system that goes anywhere. And whatever applications programs you develop for the 310, you develop only once. Since these programs will run on your other 310's or larger 300 series systems without reprogramming.

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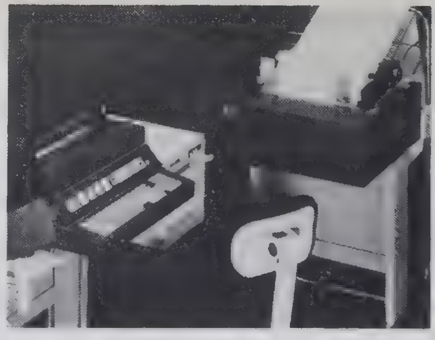
Olivetti TC 800 Modular System Works in Financial Institutions



Olivetti TC 800

NEW YORK – Olivetti Corp. of America has introduced the TC 800 financial terminal system. This modular terminal system is designed to operate as workstations and branch-office terminal configurations in banks.

The TC 800 system includes a central control unit with up to 32K of random-access memory and 32K of read-only memory, a console with a number of keyboard arrangements, a 260-character CRT display, a passbook and journal printer with a magnetic stripe reader/recorder, a credit card reader, magnetic tape cassette or floppy disk and auxiliary high-speed printers.

These modules can be combined to create a teller or administrative terminal. A terminal may consist of only a keyboard console and display, for example, or it may be configured with a keyboard console and passbook printer only or with keyboard console, display and printer.

Three Versions

Three versions of the TC 800 terminal are available, the stand-alone, the master station and the satellite version. The stand-alone version is designed for connection to the communications line for direct interaction with the mainframe.

A TC 800 master station is interfaced to the communication line and directly interacts with the mainframe. In addition, it provides the interface to the communications line and controls the interchange of messages to TC 800 satellite terminals.

The TC 800 system may be supplied to operate with any communications protocol required in either an asynchronous or synchronous mode at speeds of up to 4,800 bit/sec.

The system costs $9,000 to $13,000 depending on configuration. First deliveries are scheduled in 1976 from 500 Park Ave., 10022.

Model 730 Code Translator Converts Ascii to Baudot Code

COLUMBUS, Ohio – MI^2 Data Systems, Inc. has introduced the 730 CT code translator.

The unit converts 8-level Ascii code data to 5-level Baudot code data, and vice versa.

The device costs $437 from the firm at 930 Kinnear Rd., 43212.

Terminal Tidbits

Dial-Up Version of Amcat Aids Participation in EFTS

CLEVELAND – The Data Systems Division of Addressograph Multigraph Corp. has a dial-up version of its Amcat terminal.

The dial-up terminal is said to make it feasible for the lower volume user to acquire terminals compatible with electronic funds transfer system (EFTS) requirements. The Amcat can be equipped to read either magnetic stripe or embossed character data.

In a normal transaction, a plastic identification card is inserted in the terminal and data is keyed into the keyboard. A Process key is then activated and, when the operator hears a go-ahead tone, the data key on the telephone is activated.

After receiving a response from the computer, the telephone handset is hung up and the transaction is completed.

The dial-up Amcat can be operated through any standard telephone equipped with the Bell System Data Access Arrangement and is adaptable to any type of service including Direct Distance Dialing, Wats and Foreign Exchange.

The terminal is priced at about $1,600 from 20600 Chagrin Blvd., 44122.

Coupler 'No Bigger Than Phone'

CAMPBELL, Calif. – Ven-Tel Corp. has a small acoustic coupler described as no larger than a telephone.

The basic coupler operates in the originate mode with an originate/answer model available as an option. Transmission rates run from 0- to 300 bit/sec in half- or full-duplex mode, with EIA or teletypewriter interface, the company said. Indicator lamps show power on-off condition and carrier presence.

Suitable for desktop or wall mounting, the coupler is priced at $195. It is also available in kit form for $110 from 1190 Dell Ave., 95008.

RFL Adds Data Transceiver

BOONTON, N.J. – RFL Industries has introduced a voice-frequency carrier transceiver (VFCT), Model 68 TX/RX, which provides for data, speech-plus-data and other applications.

Optional circuits may be added to the basic unit, in factory or field, by adding components for which provision already has been made on the circuit board.

Other changes are made simply by moving jumpers to connect circuits differently. Only those features actually desired need be purchased initially.

All CCITT and Bell frequency assignments can be supplied as well as others for data rates up to 600 bit/sec. Voiceband groups of 24 75-bit/sec channels, 18 110-bit/sec channels or other groupings and speeds may be supplied.

For single-channel terminals, a desk-mount chassis is available.

Price per terminal is about $315 with delivery in eight weeks from Powerville Road, 07005.

Vadic Module Acts as Bell 202D

MOUNTAIN VIEW, Calif. – Vadic Corp. has announced a 1,200 bit/sec modem module that performs the functions of a Bell 202D and is designed to be built into OEM equipment.

Designated the Model 81094, a single unit can be purchased for $120, or 10 cents per bit/sec. In quantities of 100 or more, the unit price drops to $95.

The modem module is contained on a single PC board that measures 2-7/8 in. by 9 in. by 3/4 in. Operation at 1,200 bit/sec is half-duplex over a two-wire private line or full-duplex over a four-wire private line for multipoint polled data communication networks.

Vadic is at 505 E. Middlefield Road, 94043.

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CMI Adds 370/135 Memory For 40% Below IBM Cost

BEDFORD, Mass. – Cambridge Memories, Inc. (CMI) has an expansion memory system, called 370/Stor 135, for IBM 370/135s.

The unit is priced approximately 40% below IBM memory for comparable configurations, CMI said.

In addition to an automatic single-bit error correction capability, the 370/Stor 135 is available in size increments duplicating most IBM increments and can be installed or upgraded at a user site in several hours, with minimal processor change, CMI said.

The memory system also has two switches that provide backup to memory operations.

The reconfiguration switch permits computer operators to switch out any 64K-byte sector of 370/Stor memory from total systems operation. The feature, used during diagnostic or error conditions, contributes significantly to the continuity of processor uptime, CMI claimed.

The off-line switch provides built-in backup in the event of failure of resident IBM memory. In such an instance, an operator switches out the failed memory and 370/Stor 135 continues to run at its full capacity, CMI said.

Read, Write Times

The system is said to have a read time of 770 nsec and a write cycle time of 935 nsec.

Shipments of the system, which will begin in the fourth quarter, will incorporate CMI's recently announced 1K MOS "n" channel static chip as the basic storage element in the product, the company said.

Modular design of 370/Stor 135 enables users to install any memory size, from 64K-byte to 128K-byte sectors, up to a maximum of 512K bytes. Expansion of the system at the user site is made possible by the use of plug-in memory cards.

A typical 288K-byte system added on to a resident 96K-byte IBM memory has a purchase price of $126,000 or, on a five-year lease, a monthly price of $3,230.

CMI is at 12 Crosby Drive, 01730.

Downgrade to 360 Saves Bank Money

BALTIMORE, Md. – A growing number of DP managers are questioning whether their IBM 370 systems represent the best value for their particular computer needs. And, increasingly, the answer seems to be no.

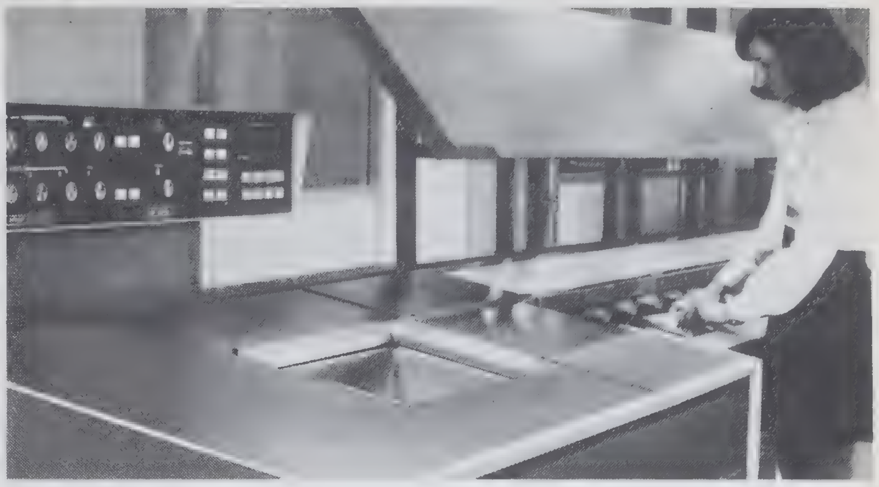
Exemplifying this shift in thinking, the Provident Savings Bank here underwent what is called "reverse migration" – trading in its IBM 370/145 for an IBM 360/65 on a 36-month lease from Itel Corp.

"Provident should realize a savings of approximately $150,000 over the next three years. This savings will be achieved while increasing performance and includes the availability of DOS/VS – two key factors in our decision to go with Itel's 360/65 package," according to Anthony Tomlinson, Provident's DP manager.

Provident uses its computer capability for all its banking operations, including an on-line network of over 100 terminals to 26 local branches and departments.

"The increased performance we've noted, to date, understandably makes the Itel 360 package very attractive. Itel's 370 simulation on the 360 is very satisfactory," John Whitfield of Provident, who was responsible for the actual conversion from 370 to 360, commented.

Itel's Packages Lease for the bank includes: an IBM 360/65 – 512K (all Advanced Memory Systems, Inc. memory); an IBM 1419 check sorter; 7830/7420 Model 5 tape drives; and DOS/VS.



Burroughs B9137 Electronic Reader/Sorter

Burroughs Reader/Sorter Reads 'Imperfectly Encoded' Documents

DETROIT – Burroughs' high-speed B9137 electronic reader/sorter is said to enable banks and other businesses to significantly reduce the cost of processing checks, deposit slips, loan coupons and other documents encoded with magnetic ink and/or optical characters.

The B9137 can read many imperfectly encoded documents which would otherwise be rejected and require costly manual correction, the company said. The reader/sorter reads each line of magnetic ink characters twice, on a single pass of the document, using two different reading techniques.

The reader/sorter can be equipped with a microfilming unit and a nonimpact alphanumeric jet ink printer for endorsing and canceling documents. The reader/sorter can also be equipped to read both optically and magnetically encoded documents of varying sizes and weights intermixed with each other.

Modules of four pockets each permit expansion of a system on-site to a maximum of 32 pockets. Multiple reader/sorters can be used on-line to Burroughs computers.

With the microfilming unit, both the front and back of the documents can be microfilmed simultaneously at a 50-to-1 reduction ratio as they pass through the reader/sorter. As microfilming occurs, each document is given a nine-digit identifying number. The same number can be placed on the document itself if the reader/sorter is equipped with the nonimpact printer.

Nonimpact Printer.

The nonimpact printer is capable of printing up to three lines of endorsement on the back of a document with the additional capability of printing a single line of characters on the face of the document.

The reader/sorter can read numeric optical and magnetic fonts which conform to international and U.S. standards. The system can read single lines of either optical or magnetic characters; two lines, one optical and the other magnetic; two lines in which the optical font is the same; or two lines with different optical fonts, Burroughs said.

Purchase prices range from $81,000 to $310,000. Monthly lease rates range from $1,800 to $6,800.

Deliveries are scheduled to begin early in the fourth quarter from the firm here in Detroit, 48232.

10 Times That of CMC-5

CMC-6 Features Greater Storage

MARINA DEL REY, Calif. – The CMC 6 key-to-disk system from Computer Machinery Corp. (CMC) is said to offer 10 times the disk storage capacity of the company's CMC 5 at a nominally higher price.

A CMC 6's magnetic disk unit can store over 200,000 80-character records and over 1,000 record formats. In addition, the disk holds user libraries and system management aids.

A standard CMC 6 includes a supervisory console, an IBM 2314-type magnetic disk unit and a Teletype KSR 33 teleprinter. The console houses a system control panel, a general-purpose computer, a magnetic tape unit and associated electronic control circuitry.

The CMC 6 can have up to 16 CRT or panel display keystations. Other optional hardware includes a second tape drive, a 115 or 300 line/min printer and a duplex control unit for multisystem installations.

Telebatch Option

The Telebatch data communication system is also available as an option. With Telebatch, the CMC 6 functions as a Hasp IBM 2780-type workstation, communicating at up to 19.2 kbit/sec with host computers, other key-processing systems and other terminal devices. Data communication takes place concurrently with data keying, CMC said.

Standard CMC 6 software features a foreground formatting capability that includes expanded support of tape-entered applications such as turnaround documents and OCR Micr rejects. Standard software also includes numerous reports and procedural aids such as output reformatting, operator analysis, hard-copy audit trail, application security features and media conversion routines.

The operational data validation feature provides user-programmable routines for balancing and totaling numeric data; for making alphanumeric range and value tests; and for interfield, interrecord and interbatch dependency tests. This user programming is supported by an extensive instruction set geared to the data entry environment.

A CMC 5 can be field-upgraded to a CMC 6. A typical CMC 6 with 10 CRT keystations leases for $1,660/mo on a two-year contract.

CMC is at 2500 Walnut Ave., 90291.

Can our single source computer service be cost-effective and price competitive?
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There's a growing lineup of industrials, international airlines, government agencies and others who were convinced by the facts, figures and performance. They're all Raytheon Service Company customers. Ask them why. We'll tell you who they are when you get the full story from us. Call Mike Salter, Commercial Marketing Manager, Raytheon Service Company, 12 Second Avenue, Burlington, Mass. 01803, (617) 272-9300.

RAYTHEON

Record Validity Now 98%

Yarn Maker's System Spins Tale of Inventory Success

CHATTANOOGA, Tenn. – A three-year computer-based effort at the Standard-Coosa-Thatcher Co. (SCT) has yielded multiple benefits for the 80-year-old yarn and thread producer. Some examples:

- Most orders for stock items are now shipped the same day. Rush orders received by 2 p.m. are shipped by 4 p.m; at the same time, short shipments have been cut in half.
- The accuracy of inventory records has improved from 75% to 98.2% validity on a 26,000 case-finished thread inventory. Daily analysis of demand is now made for every finished item ordered covering 25,000 dyed items and 30 brands of thread.

Today, the three major families of files – in-process, inventory and open orders – are linked directly to the departments of SCT which need and use them. The centrally located computer communicates with departmental users by means of IBM 3270 CRT terminals.

The units are used to enter data, inquire into files and update records as changes occur in the status of orders and shipments. Display terminals are located both in the order control section of the headquarters building here and in the nearby manufacturing plants.

Wide Response Triggered

When one of the 3,000 monthly orders is received at SCT headquarters, a coding clerk converts the order data into appropriate customer and product numbers. The clerk also stamps the order form with a sequential stamping device – and that five-digit number becomes the specification number for one item in the order. A three-item order thus contains three specification numbers.

Another clerk, seated at the keyboard of the terminal, types order and specification information detail into the IBM 370/145 system which creates a master record for each order.

In-stock items are balanced with customer delivery requirements in designating, by case number, how the order should be filled and when it should be shipped.

Thread orders which cannot be filled from stock are applied against work in process. The allocation clerk has a listing of the current status of all goods in the national plant as of 5 a.m. that day and can designate goods for destination at any point in the dyeing process. Work-order (specification) numbers are paired with order numbers at that time.

At each step in order processing and allocation, the computer edits messages to ensure customer, product, specification, bill-of-lading and other identification information is current and accurate. Whether allocation takes place immediately upon receipt of an order or several days later, the computer system makes certain the correct goods are designated to fill the specific order from a given customer.

Immediate Acknowledgment

The computer also provides immediate acknowledgment of all activity. After an order entry clerk advises the computer of an order, the 370/145 produces a multipart acknowledgment form on a small IBM 3284 printer in the order entry department.

Meanwhile, when allocations occur, the computer causes a seven-part form to be produced at a printer in the shipping department of the national plant four miles from corporate headquarters.

The top three copies comprise a picking instruction and shipping instruction package; the bottom four, full bill-of-lading instructions.

The original form is an actual shipping record complete with customer name, "ship-to" information, case numbers, locations, quantities and gross and net weights as well as specific shipping instructions.

A packing list, the first carbon, is identical with the shipping document.

The third carbon, the picking and billing control document, is sent to the billing department after goods are picked and input in the company-wide billing system.

The fourth carbon is the first page of the bill-of-lading package. It is the customer's copy. The fifth is for trucking company use; the sixth, for traffic; and the seventh, the shipping department's own bill-of-lading record copy.

Last Step

As stock is picked, a small stub from the case label – which contains specification number, weight and product information – is removed from each case.

The stub and the shipping documents become the turnaround documents used by the 3270 clerks in the shipping department. Their entries advise the computer that the goods have, in fact, left SCT bound for the customer, and this information may be retrieved as needed.

Shipping is the last step in the continuously computer-monitored process. Just as important to the success of shipment as control of order entry, allocation and finished goods inventory is under the control of production.

In-process status reports are prepared nightly. When production orders are generated, the computer assigns specification numbers and prints the corresponding case label as thread comes off the national plant rewind floor.

The multipart case label consists of a permanent label with customer name and ship-to data (for goods allocated in process), weight and product information such as length, size or ply, brand and description.

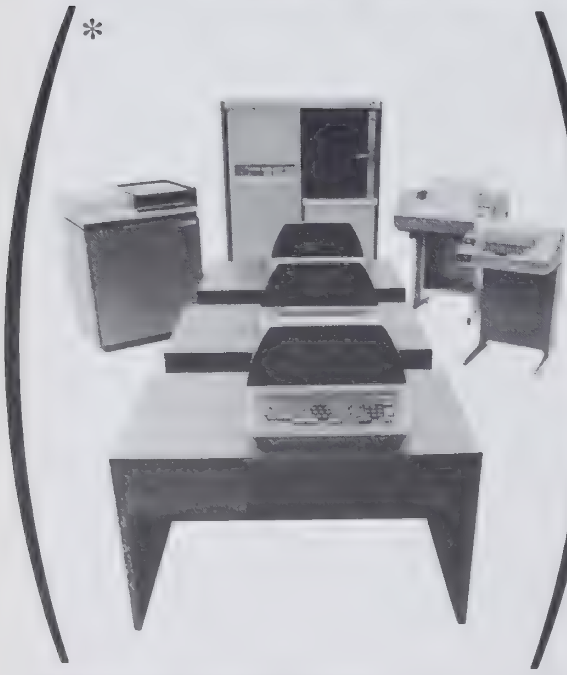
Stubs are used to track the goods through processing to destination. When goods are released from the plant, one stub is detached as the case is closed.

After goods reach the warehouse, the stubs are detached and record the rack positions. Inventory taking recovers a third stub. The fourth is detached at the scales when goods actually are shipped.

A fifth stub is detached when goods are transferred among SCT's seven remote warehouses.

At each step, when stubs are detached, they are returned to the computer and the data updates the records already stored within the computer system. Well before the case goods are moved out of the plant, status information is computer-processed to support the management of the national plant.

GREAT COMPUTER SECRETS*



We've been so busy developing our powerful GCS 2100 system, we've never taken the time to tell enough people what a great system it is.

How efficient it is (average of 80% reduction in errors — 35% to 85% faster document handling). How reliable it is (less than 1% downtime). How simple it is (operator training time less than 8 hours). Or how economical it is (10% to 40% savings in data preparation costs).

And our competitors have loved us for keeping it such a secret!

The GCS 2100 is a complete data entry system: it lets you collect and edit data at the source (data is actually edited while it is being keyed); store the data on disc; then transfer the clean data to an output media like magnetic tape. (Data already on tape or cards can be re-submitted to the GCS 2100 for editing, reformatting, etc.)

The GCS 2100 can interface up to thirty-two telephone lines. Card readers. Medium and high speed line printers. Four-tape drives. Four fixed or moving head discs.

All on a single system.

The GCS 2100 provides extensive I/O functions so you can transfer data to and from disc storage and other I/O devices.

The GCS 2100 can accommodate up to 64 local or remote terminals: local terminals can be located up to 2500 ft. from the system's CPU. You get faster, more accurate data entry for functions like payroll, shipping, receiving and manufacturing, because the person most familiar with the data does the keying.

The GCS 2100 also offers data entry from remote terminals (it can handle up to five remote terminals over one dedicated telephone line).

A Programmable Extension Package (PEP) extends the power and the flexibility of the 2100 system: up to 255 PEP tables provide capabilities like automatic data insertions; range and value checks; table look-ups; logical tests; character expansion; and data dependent format switching.

These tables are not job assigned, so they can be used on several different jobs.

A library of over 100 special edits is also available. (If there isn't an edit for your needs, we can design one.)

The GCS 2100 also provides up to 99 format levels per job; up to 255 balance accumulators; variable length record and blocking factors; and up to 255 jobs stored in the system.

GCS 2100 Peripherals: GCS DataTone — data entry via Touch-Tone® telephones. GCS Data Tel — remote batch communications.

For more Great Computer Secrets, contact Agent 2100 at General Computer Systems, Inc., 16600 Dooley Road, Addison, Texas 75001. (800) 527-2568 toll free. In Texas (214) 233-5800.

GCS 2100
General Computer Systems Inc

Real-Time Project Proves UK Bank Boon

LONDON – The Abbey National Building Society has experienced an average growth rate of 15% each year since 1944 and computers have been part of the Abbey National scene since 1963.

Until five years ago, however, data processing was confined to batch operations. But early in 1970 it was decided to harness the benefits of real-time computing to improve still further upon the organization's operations.

The building society, by the way, roughly corresponds to the functions of the savings and loan institution in the U.S., acting as a savings bank for investors and lending money for home mortgages.

In 1970, a project was started with a joint team from Abbey National and Univac to design a five-year scheme for installing a real-time computing system, with various phases of the plan becoming operational at regular intervals.

The heart of the system is a Univac 1106 computer with a main memory of 256K words. Peripheral equipment includes two FH-1782 high-speed drums, three Fastrand III mass storage units, 12 magnetic tape units and a data communications subsystem.

Currently connected to the central processor at Abbey House, the society's headquarters, are 330 Creed printer-type terminals distributed among 260 branch offices throughout the UK (in total, Abbey National has 270 branches and 1,000 agents in England, Scotland, Wales and Northern Ireland).

The printers have a response time of 1.5 seconds for accessing information from the central computer. They operate at a speed of 10 char./sec over 110 bit/sec lines.

Instantaneous Inquiries

Under the plan's first phase, the society placed the share and deposit savings accounts into real-time mode to allow virtually instantaneous inquiries and transactions to take place.

Abbey National has more than 2.4 million savings accounts distributed among a number of savings plans that it offers to investors. The most popular is the share account, currently paying interest of 5.6% with income tax paid by the society.

Under the real-time operation, a share or deposit account customer goes to any of the branch offices and fills out a deposit slip which is given to an operator, who keys in the information on a terminal.

The information entered into the terminal is first routed to one of eight regional data concentrators, each of which can handle up to 64 data communication lines. The concentrator edits, accepts and verifies the data and transmits it to the central computer via a high-speed line only when all the details have proven to be correct.

Automatically Verified

Before it is accepted into the Univac 1106, an automatic check is made by what is known as a surcode, which compares the typed account number and the first three letters of the investor's name with the account details on the existing account file.

If they do not correspond, a "mismatch" signal is transmitted back to the office terminal. Because this process only takes a few seconds, the terminal operator is then able to double-check his own entry to see where the error is while the customer is still at the office. This is particularly important in the case of withdrawals.

When the message is received at the 1106 system, a pseudo update to the customer's account takes place. Actually, the balance is updated along with other transactions occurring during the day after the close of business. This is a safety feature of the system in case equipment should go down.

In addition to the investment files, the mortgage account file with records of more than 500,000 outstanding mortgages is now being developed and is in operational test.

The savings accounts are kept on the Fastrand mass storage drum files. All daily transactions are duplicated on magnetic tape. The indexes to the Fastrand files are kept on the high-speed FH-1782 drums.

About 3,600 transaction/hour occur on the system on weekdays. On Saturdays, the volume reaches a peak of 11,000 transaction/hour. On an annual basis, Abbey National handles almost nine million transactions from the investment system.

In addition to the real-time tasks, the system handles a number of batch applications. These include the daily updating of the savings fund, payroll processing, personnel files, general accounting, director's reports, Save-as-You-Earn accounts, six monthly dividend payments, name and address updates, warrant clearance, mortgage change of interest and mortgage statement production.

With the real-time system, the society's management can analyze data and gain valuable information on business trends on an up-to-the-minute basis. The data it receives includes such things as the day's total investments and withdrawals throughout the country, comparisons with previous weeks or months cash-flow statements broken down regionally.

Difficult Without It

"With the continual expansion of the society, it would have been difficult to imagine how we could have efficiently sustained growth without an on-line system," A. Hemsley, DP manager for Abbey National, said.

"Prior to the introduction of the real-time system, when we were operating in batch mode for share and deposit accounts, approximately 10 days elapsed before the file was updated with a transaction," he recalled.

A Univac 1106 is at the center of the Abbey National Building Society's real-time system.

"Also, because the source of the transaction was remote, error rates were high. By validating the transaction in an on-line mode, errors are nil and the file is updated immediately," he said.

"We also have a passbook auditing facility on-line and whereas previously perhaps long delays would occur, we can now usually turn around passbooks in a couple of days," Hemsley added.

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Data Communications

Course #1010–

Practical Data Communications Systems and Concepts

This course will give you the information you need to master the newest developments in Data Communications. Led by the nationally recognized teleprocessing consultant, Dr. Dixon Doll, the course covers recent changes in areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers. This seminar runs two days, and total cost, including workbook, reference materials, luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule is as follows

Chicago–Jun. 2-3
Orlando–Jul. 2-3
Washington, D. C.–Jun. 9-10

Course #1020–

Advanced Teleprocessing Systems Analysis and Design

This course is a follow-up to Course #1010, with special emphasis on problem solving techniques for minimizing operating costs in commercial data communications networks. Also led by Dr. Dixon Doll, the course covers procedures, approaches and algorithms for evaluating and cost-optimizing network organizations

This seminar runs three days, and total cost, including an extensive set of customized course materials, luncheons and continental breakfasts is $450. Additional registrants from the same company qualify for a reduced rate of $400. Current schedule is as follows

Los Angeles–Jun. 16-18

Data Base Design

A practical approach to the design, implementation, and maintenance of data base systems.

Effective data base system design requires both a complete knowledge of the facilities provided by a data base package, and a basic understanding of the mechanisms which can be employed to construct data base systems. In fact, the former is of questionable value without the latter.

This course is a package independent examination of the techniques required for the design of effective data base systems. The topics covered include

- *Effective Record Design*
- *Physical Storage Techniques*
- *Optimum File Organization and Indexing Techniques*
- *File Integration*
- *and much more*

Given in association with Leo J. Cohen and Performance Development Corporation, this course reinforces the lecture material with workshops, in which attendees apply the techniques just learned, to practical problems

You should attend this seminar if you are (or will be) involved in the design and/or implementation of a data base system and whether as a Data Base Designer, Planner or Analyst

This course runs for 3 days and costs $350, including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule

Chicago	Sheraton O'Hare Motel	May 12-14
New York	The Plaza	June 2-4

Legal Tools for Computer Contracting & Protection

A seminar that gives you the legal tools you need for effective negotiations, agreement drafting, warranties, security, tax planning and software protection.

The impact of the law is felt in virtually every aspect of the computer industry, and you need to know how to apply the legal rules in a positive way to increase you advantage in dealing with vendors that supply your installation. This course teaches you how to avoid the legal pitfalls that can be costly and embarrassing to you.

Under the personal instruction of Roy N. Freed, a nationally known lawyer, author, educator and expert in the field of Computer Law, you'll learn how to protect your interests in subject areas like these: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, as well as Techniques in handling any transaction. And practical discussion and review of your own contracts is an added feature of this seminar.

You should attend this seminar if you are involved in contracting for the use of computers or computer services–whether as a Corporate Executive, DP Manager, Contract Administrator, Consultant, Inside Counsel, or as a Private Practitioner involved with clients who use computers. Cost for the entire 2½ day seminar, including continental breakfasts, luncheons, and complete resource materials is $325. Additional registrants from the same company are charged only $275. Current Schedule

New York	St. Moritz	June 4-6
Atlanta	Stouffers Atlanta Inn	April 23-25

Performance Evaluation and Improvement

A seminar actually designed to save your installation money.

This course starts with a discussion of questions and specific problems attendees have about system performance at their own installation. Then step by step each attendee will learn the methodology necessary to understand the problems and implement the answers. The techniques presented at this seminar are in effect at numerous installations today, and have extended the life of one S/360 for more than two years–a savings, at last estimate, of more than $700,000 for one user

Our course leader is Saul Stimler. His book, *Data Processing Systems: their performance, evaluation, measurement, and improvement*, will be an important part of the seminar. As well as case studies, topics that will be covered include:

- *Criteria for quantifying performance* • *Pencil and paper analysis of a system*
- *Benchmarking techniques* • *Realtime, batch, and interactive time sharing systems*

You should attend this seminar if you are a data processing professional or corporate executive whose responsibility it is to plan, benchmark, evaluate, or improve data processing systems.

Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials (including a copy of Saul Stimler's book on the subject) is only $250.

Current schedule

New York	**Waldorf-Astoria**	**May 5-6**

FIRST TIME!

THE EDP SEMINAR SERIES sponsored by COMPUTERWORLD

Key-to-Storage Systems

How to evaluate and optimize the various successors to keypunch equipment.

Data entry is a big problem–and a big headache–as every computer user knows. It is therefore a prime target for cost savings. This course is designed to help you in the practical aspects of selecting, installing, and making the best use of keyboard-to-storage systems. It is an expansion and an update of our successful key-disk seminar. Under discussion (including some user case studies) will be

- Introduction to data entry concepts (keypunch, buffered keypunch, keypunch, key-disk and beyond . . .)
- Key-disk hardware and software
- Evaluating . . . and starting . . . key-disk systems
- Selecting and operating intelligent terminals, both key-to-cassette and key-to-floppy disk
- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is $350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only $300.

New York	Waldorf Astoria	April 21-23
Chicago	Hyatt Regency O'Hare	June 9-11

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NOTE: If time is short, you may reserve space at any seminar by calling collect. Call Miriam Ober at (617) 965-5800.

Mini Bits

Multiplexer Family Linked To All DG, DEC Minis

ELMSFORD, N.Y. – A series of asynchronous communications multiplexers interfacing with all Data General (DG) and Digital Computer Controls, Inc. minicomputers is available from Mini-Computer Systems, Inc.

The Multiplexers have individually selectable bit/sec rates in either current loop or RS-232C format.

Configurations can be four-line, eight-line or 16-line, with real-time clock and master control facility included. Automatic answer and modem controls are optional features.

The multiplexers cost from $1,400 to $3,500 from the firm at 525 Executive Blvd., 10523.

Controller Interfaces 3M Drives

SANTA ANA, Calif. – A cartridge controller designed to interface all popular minicomputers with 3M cartridge drives is said by its vendor, Peripheral Interface Corp., to emulate 1/2-in. tape drives and provide operating software transparency.

The controller has read-after-write error checking and Ansi standard one- to four-track interchangeable cartridge formatting.

Four parallel ports for added controller reliability eliminates daisy chaining while modular construction allows total system flexibility for future system upgrading, the firm said.

Priced at $3,300, the cartridge controller comes with software, interconnects, cables and documentation. The firm is at 1616 S. Lyon St., 92705.

Printer Claims Low Failure Rate

MOUNTAIN VIEW, Calif. – Hydra Corp. has announced its Model-B, an 80 char./sec 9-by-7 dot matrix printer.

Actual runs of production print heads have printed up to one billion characters before any kind of failure occurred, or 40 times present standards, according to the firm.

The Hydra head uses electromagnets that activate small hammers which, in turn, ballistically propel the matrix wires.

The electromagnets use a small fraction of the power of solenoids and thus generate far less heat, according to the firm.

The Model-B printer prints bidirectionally at 180 char./sec, providing a throughput of 85 line/min, a fully buffered input that provides for continuous operation and a built-in microprocessor that controls the printing mechanism and format of the data.

The printer is priced at $3,750 from the firm at 2218 Old Middlefield Way, 94043.

DEC Releasing XVM Series, Line of Upgraded PDP-15s

MAYNARD, Mass. – A series of upgraded PDP-15 minicomputers has four times greater program-size capacity, up to 30% faster execution speeds and is priced as much as 18% below existing PDP-15 configurations, according to Digital Equipment Corp.

Two basic XVM configurations are available, XVM-100 and XVM-200, with prices starting at $37,500 and $57,500 respectively. Deliveries are scheduled for this fall.

XVM-100 single-cabinet hardware configurations can be used as the foundation for a larger system. They include the XVM central processor, 32K words of core memory, high-speed paper tape reader and punch, hardware multiply/divide, real-time clock, and the LA36 Decwriter II keyboard printer. Expansion to 96K words is possible within the single cabinet and, with an expander cabinet, 128K words.

XVM-200 systems are dual-processor arrangements that include a PDP-11 peripheral processor. They feature full I/O spooling for low-speed equipment such as line printers, card readers and plotters. XVM-200 incorporates all XVM-100 components plus a PDP-11 with 8K words of memory and a 1.28M-word cartridge disk and control.

More Efficient

The systems' increased addressing and instruction look-ahead extend the concept of asynchronous operation, allowing larger and faster PDP-11s to be used in dual-processor configurations.

These capabilities also make the graphics systems for computer-aided design both more efficient and more economical, DEC said. The systems are upward program-compatible with previous PDP-9 and PDP-15 configurations.

The XVM systems' increased speed derives from instruction look-ahead hardware that anticipates and retrieves instructions in advance of central processor requests. An addressing scheme permits the computers to address 128K words of memory. This allows core resident programs four times longer than those possible in previously available configurations. Low-cost expandability is possible with the XVM's use of high-density core memory, DEC added.

Three software systems are available: XVM/RSX, a resource-sharing package for multiprogramming environments; XVM/DOS, a disk operating system for interactive graphics and batch computation; and XVM/Mumps, for time-shared data base management with up to 48 on-line users.

DEC's XVM series features four times the memory capacity of the PDP-15 at speeds up to 30 times faster.

XVM/RSX multiprogramming hardware is available for these systems at $76,600. This represents an 18% price reduction over former PDP-15/RSX hardware configurations, DEC said.

Mumps time-sharing systems and multi-terminal graphics systems are reduced in price correspondingly.

At South Carolina Knitting Mill

Monitoring System Aids Efficiency in Busy Time

By William A. Taylor
Special to Computerworld

SPARTANBURG, S.C. – When the knitted goods market was soft in the fall of 1973 and the spring of 1974, Olympia Industries, Inc. handled numerous short runs and took on many orders with fast-delivery requirements to keep the 123 double-knit machines running. Short-term scheduling required a larger than usual number of machine changes.

But knitting machine efficiency rose from 85% to about 89% to 90% and off-standard quality goods dropped from 3% to 1.8% – despite a substantial increase in knitter work assignments.

A computer-based machine monitoring network, running under IBM's Textile Monitoring System (Tims) contributed heavily to increased machine efficiency.

Some of the gain in efficiency was due simply to the fact that the work of each knitter and fixer was much more visible.

Greater productivity is achieved because we can know about our problems as they occur – in time to take effective corrective action.

Selection of Tims

Knitting Division management first considered computer monitoring about two years ago in an effort to find out why machines were running at an efficiency level of only 76% to 78%.

We evaluated several different computer systems, then selected Tims and the IBM System/7. This combination could handle effective machine monitoring, and we saw that it could be expanded into greige inspection, finishing, final inspection, production planning and yarn inventory control.

While we were waiting for the new system to be installed, frequency checkers made random ratio-delay checks, a statistical sampling technique, so we could begin to determine the reasons for machine downtime.

This approach is fairly accurate over the period of a week and enabled us to pinpoint some of the problems and raise the efficiency to the 84% to 85% range.

However, we were still faced with the time lag inherent in this method. At best, we had an excessive number of five-minute to 10-minute machine losses. At worst, we could see that a machine ran poorly yesterday – too late to take action.

The time lag has been eliminated under Tims, which became fully operational in late 1973.

The System/7 checks each machine every six seconds; if it is running properly, it goes on to the next one. If the machine is stopped, the computer checks whether one of the four automatic stops is the cause.

If so, it stores the data, including both the reason for the stop and the duration. If it is not one of the automatic stops, the System/7 waits until the operator keys in the reason, then stores this data.

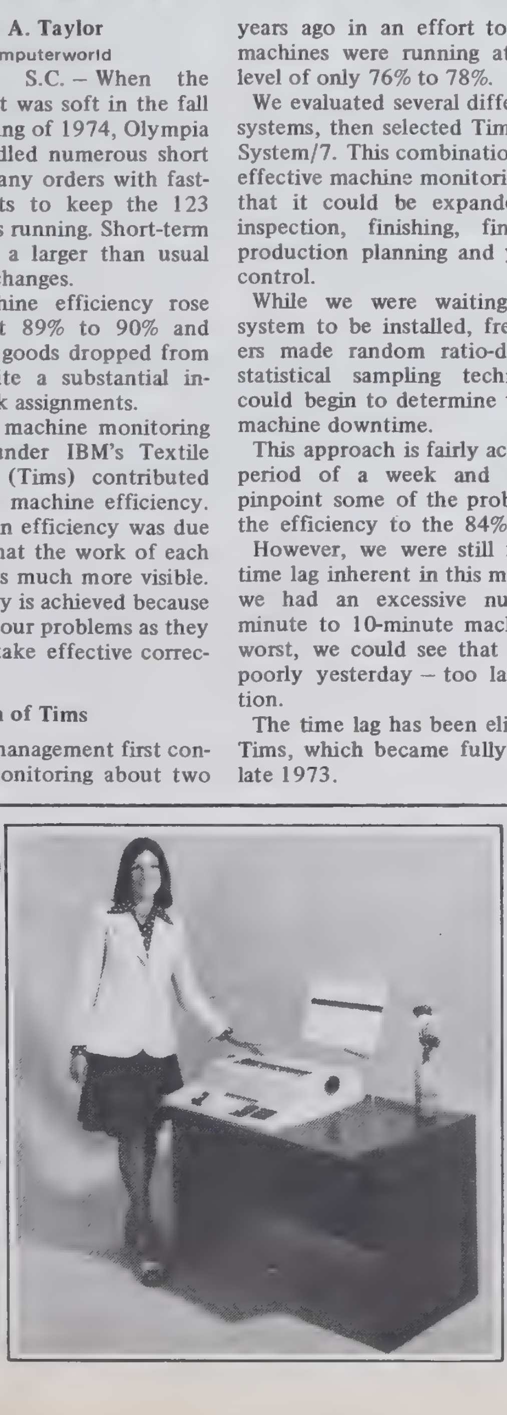
However, if after five minutes the operator has not made an entry, the computer produces an alarm message on the console typewriter, including the machine number, "no cause entered" and duration of the downtime.

The system also prints exception messages such as "nonstandard rev/min" and the machine number. The console and the System/7 are located in an office adjacent to the knitting floor and are constantly checked by the shift supervisor.

The console typewriter and all the data entry units can be used to make any of 25 separate inquiries such as requests for information on machine detail stops, machine summary stops, knitter/weaver set assignment, worst machines in plant

(Continued on Page 33)

AT LAST-
a terminal designed
for you et al
[your programmers,
secretaries, typists,
operators, etc.]



- Selectric-style keyboard generates full ASCII character set.
- 30 cps printer with interchangeable type fonts provides up to 6 superb copies.
- Unique operator-programmable 10-key pad speeds numeric data entry.
- Tabs, margins, horizontal and vertical character and line spacing can be set or changed locally or under computer control.
- Coordinated controls and display panel simplify operation and keep operator appraised of system status.
- Convenient, comfortable, attractive work station.

Time *is* money.
Boost productivity today with the Trendata Model 4000.

Call or write for details.
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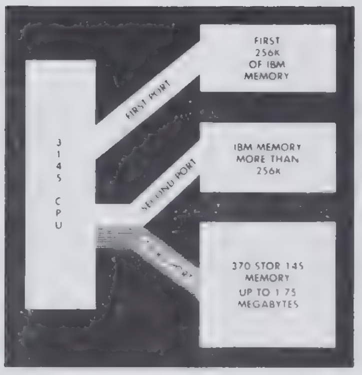
Progress Report:

370/STOR 145

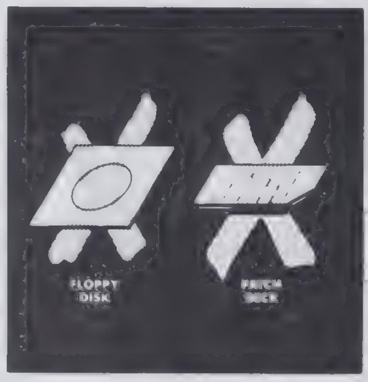
IT'S THE THINGS THAT ARE DIFFERENT THAT MAKE THIS MEMORY SO SUCCESSFUL.

370/STOR 145 is an expansion memory for IBM 3145 processors. In less than a year, it has become the dominant product in its market. Why? For one thing, security. Model 3145 users know Cambridge is the only independent supplier that designs, manufactures, sells and services the systems we install. For another, performance. 370/STOR 145 is different from any other 3145 add-on memory; and it is these differences that make it attractive. For example:


FIRST 256K OF IBM MEMORY
FIRST PORT
IBM MEMORY MORE THAN 256K
SECOND PORT
3145 CPU
370 STOR 145 MEMORY UP TO 1.75 MEGABYTES

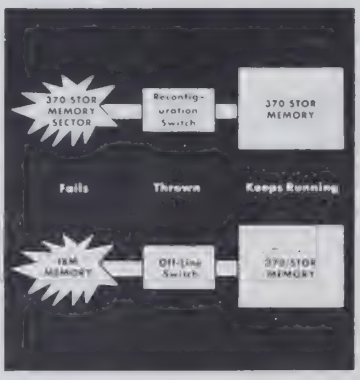
UNIQUE THIRD-PORT EXPANSION

Only 370/STOR lets IBM 3145 users add any amount of memory – up to two megabytes – on top of *any amount* of resident IBM memory – with complete transparency and no CPU tampering. Our third port shares IBM's second memory channel with resident IBM memory, so you can add low-cost Cambridge memory very simply, regardless of how much IBM storage you have. And it works so well, even IBM approved it.



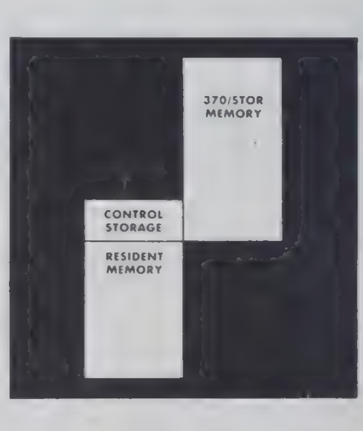
NO FLOPPY DISK MODIFICATION

A user can add 370/STOR 145 memory, in any size increment, without tampering with the console file. No patch decks are required, ever. So what happens on your "floppy disk" is between you and IBM. Cambridge doesn't get involved.



UNIQUE MEMORY PROTECTION

370/STOR 145 detects and corrects all single-bit errors, and detects multi-bit errors. So do other 145 memories. So to be different we add a reconfiguration switch to let you dial out failed 370/STOR memory, *plus* an off-line switch to dial out failed IBM memory. Either way, you keep running.



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Even IBM must change address lines when you add its memory. But not Cambridge. 370/STOR 145 is directly addressable up to 2048K without any change. It floats on top of any IBM address level. That's the secret of our modular expansion, lack of CPU alteration, and freedom from console file tampering.

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Subsidiary: Cambridge Memories GmbH, 6078 Neu Isenburg, West Germany 06102-36092.

DEC Packaged System Designed To Reduce Energy Consumption

MAYNARD, Mass. – A real-time minicomputer package designed expressly to control and reduce energy consumption for heavy users of electricity has been introduced by Digital Equipment Corp.

Called the Power Demand Control system, it is priced under $30,000 and is based on a PDP-11/10 minicomputer in an Industrial 1100 configuration.

The system offers a software package that permits users to assign equipment and priority allocations to match their particular situations. Operating under DEC's RSX-11M real-time software executive, the application package permits the user to modify operating parameters without having to reassemble or restart the program.

The hardware package includes a PDP-11/10 minicomputer with 16K words of core memory, an industrial process I/O interfacing subsystem, a keyboard terminal and cassette storage.

The Power Demand Control system is designed to reduce peak-power demands. It is linked to power company metering equipment to monitor and project actual power consumption. By specifying which electrical loads are not critical to facility operation such as ventilators, air conditioners, water heaters and outdoor lighting, the user can develop priorities for electrical equipment the system can control. By cutting off these noncritical trical loads, the system can reduce po demand peaks, equalizing the electrica load, thus reducing power consumption and peak-load requirements.

Miniworld Products

HP Processor Holds 128K Words

PALO ALTO, Calif. – The latest model processor in the Hewlett-Packard (HP) 21MX series, M/30, is the top of the line in memory and powered I/O accommodations, according to the firm.

With twice the memory capacity and 50% more I/O space, it is priced 17% higher than the next-smaller model in the line, the company said.

The processor can self-contain up to 128K words (265K bytes) of high-density semiconductor memory and 14 powered O channels, the vendor said.

he M/30 makes it possible to configure a 128K 21MX at a price 25% lower than with earlier HP hardware.

M/30 is 12-1/4 in. high. The standard configuration of the new model, like all 21MX minis, has 128 instructions, including floating-point firmware, memory parity, extended arithmetic unit, bootstrap loader and full operator panel. It is fully user-microprogrammable.

The price of an M/30 with 32K words of 4K random-access memory (RAM) is under $9,000. A 64K model with Dynamic Mapping is $14,000. The least costly 128K model (which uses an extender) is under $24,000.

First customer deliveries are expected in August from the firm at 1501 Page Mill Road, 94304.

Quest-Icon Retrieves Data in Three Seconds

CULVER CITY, Calif. – Quest-Icon, from Image Systems, Inc., is billed as an interactive micrographic data-retrieval system.

Each Quest-Icon terminal contains the same reports, signatures, drawings and pictures and other data as the others in the system.

If the user knows the particular frame number for the data he is looking for, he can call it onto the display that way. If not, the user can communicate from the terminal over phone lines to the Quest-Icon system's Varian 620L processor, which provides indexing routines to help the user locate the desired frames.

Each Quest-Icon terminal provides random-access storage of about 213,000 8-1/2-in. by 11-in. pages. Any page is retrievable in less than three seconds and can be reproduced as hard copy, Quest-Icon said.

The Quest-Icon system is available as either a bundled package containing indexing software, minicomputer and peripherals and terminals, or Quest-Icon will provide the terminals and advise the user on programming his mainframe to provide the indexing.

The terminals sell for $11,590. A 32K CPU, disk drives and other peripherals sell for about $64,750, not including application software, a spokesman said.

Image Systems is at 11244 Playa Court, 90230.

Monitoring System Keeps Mill Efficient

(Continued from Page 31)

by percent, etc.

Responses to the inquiries are printed on either the console typewriter or the printer, which is located in a second office adjacent to the knitting floor. All data in response to inquiries is available for the three previous shifts.

The system automatically produces a series of detailed reports during and/or at the end of each shift and each week. Virtually all of these compare actual and standard efficiency. Standard and actual efficiency for the entire plant during each shift are also calculated along with the distribution of stops and percent loss for each stop.

As a direct result, Olympia supervisors no longer have to circulate around the floor looking for problem machines or to rely on memory. Now they are alerted to the problems and can concentrate on solutions.

It is important to note, however, that a major factor in the success of the system is fast, well-informed action on the part of the supervisors. They use the output well, in part, we suspect, because they were involved in the system from the day it was installed.

Taylor is the knitting manager at Olympia Industries.

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Mycro-Tek MT 8080 Lets User Configure Own I/O

WICHITA, Kan. – The MT 8080 PB from Mycro-Tek, Inc. is a single-board, general-purpose microcomputer with a large wire-wrap section that allows the user to configure his own I/O and bus structure, the firm said.

The MT 8080 PB is built around an Intel 8080 CPU and includes clock generator, power inverter, bus interface, timing logic and provisions for 1K by 8 programmable read-only memory (Prom). The board's overall size is 7-1/2 in. by 13-1/2 in.

All CPU status and control signals are decoded and buffered with high-fan-out TTL-compatible devices. These signals are available at posts near the wire-wrap area of the board.

A companion board containing up to 32K by 8 random-access memory (RAM) that can be populated in 4K sections up to full capacity also is available.

The MT 8080 PB costs $850 from the firm at Suite 214, 6631 E. Kellogg, 67207.

Microworld

Microdos Tests, Develops Software For Microprocessor-Based Products

SANTA MONICA, Calif. – Microdos, a disk-based microprocessor software development system from Jacquard Systems, is designed to develop and test software for most microprocessor-based products and can be used to develop software for National Semiconductor and Intel microprocessors as well as others.

The system contains an integrated CRT display, typewriter keyboard, two floppy disk drives, a line printer and 32K bytes of core memory.

Microdos includes an assembler, a source file editor, a program loader, a file manager, microprocessor utility programs, Basic and a microprocessor simulator.

Programs are written and edited using the system keyboard and CRT display, then stored directly on the disks. By programming in Basic, programming time is reduced and training, documentation and program maintenance are simplified, the vendor said.

When microprocessor software development is completed, the Microdos system can be put to work in other applications, it added.

The system can be leased for $500/mo from the company at 1505 Eleventh St., 90404.

Intel Programs Put in Library

SANTA CLARA, Calif. – Over 55 nonproprietary programs, subroutines, procedures and macros written for Intel Corp.'s 8008/8080 and 4004/4040 microcomputers are available through Intel's Microcomputer User's Libraries.

A 12-month subscription to the library is free to users who contribute a qualified program to the library. Others can subscribe by paying a $100 membership fee.

Initial Programs

Initial programs offered by the Microcomputer User's Library include: operating, testing and debugging programs; math and numerical manipulation programs; cross assemblers for Hewlett-Packard 2100s and Digital Equipment Corp. PDP-8s and PDP-11s; and an assembler which runs on the Data General Nova.

The User's Library manager is at Intel Corp., 3065 Bowers Ave., 95051.

Intel Tape Reader Fits Intellec 4 Systems

SANTA CLARA, Calif. – The Intel IMM 4-90 is a high-speed paper tape reader for Intellec 4 Model 4 and Model 40 microcomputer development systems.

The reader transfers data asynchronously at 200 char./sec. This allows 4,096 bytes to be loaded in an Intellec 4 program memory in less than 30 seconds.

Hardware compatibility is provided by the reader's interface cabling and by the Intellec 4 IMM 4-60 I/O module option, which includes reader input and output ports.

The IMM 4-90 may be rack-mounted or used on a tabletop. Its price of $975 includes cabling, tape guide, fanfold tape and all documentation, Intel said from 3065 Bowers Ave., 95051.

DX980...the operable system from Texas Instruments

The most powerful operating system for a minicomputer is also one of the easiest to use. Why? Check these features... "cookbook" job control language, sophisticated file management for three file types, 400-megabyte disc capacity...and more!

DX980 general-purpose operating system supports TI's Model 980 series minicomputers in various applications including batch processing, interactive terminal processing and real-time applications... simultaneously or each one individually.

System Description

DX980 features a modular organization. General executive functions are included in the nucleus, while specialized functions are embodied in the subsystems.

With this arrangement DX980 can efficiently manage multijob, multitask, memory, and I/O functions... all concurrently. In addition, the system contains a sophisticated file management feature for handling linked sequential, relative record, and key indexed files.

Another important feature of DX980 is system resource management, which includes dynamic memory allocation.

These features combined make DX980 ideal for multiprogramming applications using Fortran IV or assembly language for any number of large arithmetic operations.

Supporting Software

For such applications, supporting software includes a Fortran IV compiler; SAPG, a two-pass assembler; and DXOLE, an overlay link editor, in addition to a number of utility modules.

Hardware

The hardware configuration needed for these requirements is designed around a TI Model 980 series minicomputer with supporting peripherals. A general-purpose system capable of interactive terminal processing and batch processing could include four TI Model 912 Video Display Terminals, a moving-head disc with 2.28 million bytes of storage, a TI Model 979 magnetic tape drive, a 980B computer with 48K 16-bit words of error-correcting MOS memory, a "Silent.700*" Model 733 ASR Data Terminal, a 132-column medium duty line printer, a 300-cpm card reader... and, of course, DX980 operating system. This configuration enables users to have a $65,500 minicomputer system that can support tasks normally assigned to computer systems costing $100,000 or more.

This just may be the best bargain you have come across for your application. To find out more, contact the sales office nearest you. Or write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001. Or call (512) 258-5121, Computer Systems Marketing.

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CI Notes

Cash-Hungry Potter Closes Operations Temporarily

PLAINVIEW, N.Y. – Potter Instrument Co., which has been searching for new financing, was forced to "suspend operations temporarily" because of demands by its principal lenders.

On April 4, Marine Midland Bank, Chemical Bank and Equitable Life Assurance Society of the U.S. demanded repayment of loans.

The firm said last week it was "completing negotiations with a number of promising sources" and has shown the institutional lenders "a proposal for major new financing from a responsible source" to convince them to "reinstate their loans" and enable the firm to "reopen and operate within the next few days."

Company officials were unavailable for further comment.

Honeywell Laying Off 600

WALTHAM, Mass. – Honeywell, Inc. will lay off an additional 600 employees from its Boston-area plants this spring, making a total of 900 workers who have received pink slips from the company since the beginning of the year, when employment was 6,400.

The cuts, which affect about 50 engineers, will consist largely of administrative and manufacturing personnel in plants in Brighton, Framingham, Lowell, Lawrence and Billerica, a spokesman said.

The reason for the layoffs is "continuing economic uncertainty," he noted. Most of the employees affected are involved in the manufacture of components and the Series 2000.

Notices will be issued April 14 to hourly workers and May 2 to salaried employees, he said.

More West Coast IBM Suers Seek Fall '76 Trial Date

SAN FRANCISCO – Most of the litigants whose antitrust suits against IBM have been combined for pretrial purposes want to go to trial in about the same time frame – fall of 1976.

Attorneys for both California Computer Products, Inc. (Calcomp) and Memorex Corp. asked Judge Ray McNichols for trial dates in the latter half of 1976.

McNichols previously had postponed from September 1975 to fall 1976 the combined trial date for suits filed against IBM by Hudson General Corp., Transamerica Corp. and Marshall Industries, Inc. as their cases are based largely on the Telex case [CW, March 12].

Between now and the next pretrial hearing on June 4 in Los Angeles, McNichols will attempt to solve this dilemma.

Growing Slowly But Surely

EFTS to Nourish New Markets by '77

By a CW Staff Writer

WALTHAM, Mass. – Electronic funds transfer systems (EFTS), although they are developing slowly but surely despite nagging problems, are not expected to open major new computer markets for about two years, according to a report published recently by International Data Corp.'s (IDC) Corporate Planning Service.

To date, the only specifically EFTS computer market that has emerged is for automated teller machines (ATM), the report said.

The report cited five principal reasons for this. First, most banks still have to implement effective on-line central information files before they can begin thinking about implementing EFTS.

Secondly, banking regulations adopted to date make no specific provision for electronic funds transfer in lieu of checks, nor is it clear – except in a few recent state legislative acts – whether a remote terminal constitutes a bank branch.

Third, competitive pressures from within and without the financial industry have become much more complex with the entry of EFTS and its accompanying spectrum of marketing possibilities. Fear as to how EFTS might change the industry structure is giving rise to controversy, according to the report.

On the one hand, state bank commissioners are afraid of losing all control of branch banking in the respective states.

On the other, small banks that feel they will not be able to afford such services are claiming that EFTS, in the hands of the large banks, will wipe them out and put an end to competition.

Fourth, although consumers are the key to building up the volume needed to make EFTS cost-effective, no one has been able to tackle the problem of consumer education.

Lastly, privacy and fraud have yet to receive any extensive consideration, IDC stated.

The report said ATMs sold to date number 2,500 and are valued at an estimated $77.5 million.

ATM manufacturers seem to be lining up individual banks as customers without pushing for large single orders, according to the report. These suppliers are guessing that if they have on-site units, they will be in the best position to get future multiple unit orders when the demand for EFTS increases, IDC said.

Most of the installed ATMs are off-line cash dispensers, but suppliers interviewed indicated the trend is clearly toward on-line ATMs.

They estimated that, although only about 50% of current installations are on-line, at least 75% of new shipments are destined for such use at some future point.

The largest ATM supplier by far is Docutel, with 76% of the installations. Other competitors' units are still quite new and will undoubtedly increase their market share during 1975, the report predicted.

Mainframe suppliers are maintaining maximum flexibility toward EFTS by taking a modular approach with their equipment offerings, particularly in the terminal areas, the study observed.

Other specialized systems and service suppliers are hovering around the edges of EFTS, performing information exchange operations without actually engaging in funds transfer, IDC said.

IBM's '75 Earnings Seen Rising At Slacker Pace Than Previously

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – IBM's revenues and earnings should rise in 1975, but at a slower rate than in the past few years, according to an analysis by Goldman, Sachs & Co. here.

The most dramatic slowing will come in the area of outright sales of computer products, the Wall Street firm said, indicating sales of computer equipment should drop substantially in 1975.

In fact, the firm predicted outright sales of computer equipment would drop 28.5% from the $2.4 billion registered in 1974 to $1.7 billion in 1975.

At the same time, however, sales of other equipment are expected to rise from $1.8 billion to just over the $2 billion mark for the first time, the firm forecast.

However, the report noted this drop-off in outright sales of computer equipment will not have as dramatic an effect on the overall revenue picture of IBM as a similar, but deeper, drop had in the 1969-1970 time frame.

This is because the outright sales of computer equipment has been less dependent on leasing company activity in the past few years compared with the late 1960s.

In addition, the firm noted sales will be impacted because the upper end of the IBM line (counting the 155-158 and 165-168 as single-product offerings) "is finishing its fourth year of shipments" and has therefore peaked in purchases.

Through 1974, the more than 40% of 370 shipments have been on a purchase basis with a total of $6.6 billion worth of equipment purchased since the 370 line was introduced, the firm indicated.

But while outright sales revenues might be dropping in 1975, rental and service (R&S) revenues can be expected to increase, the research report noted.

"Rental and service revenues have historically been the stabilizing element of IBM's revenue stream," the firm pointed out.

"This is because R&S revenues constitute such a high proportion of IBM's total revenues – their lowest recent percentage of revenues was 58.3% in 1968; the highest level was 73.6% in 1971," the report

(Continued on Page 36)

Support Costly But Crucial Part Of Small Business Systems Sales

By Nancy French
Of the CW Staff

NEW YORK – Not everyone can market small computer equipment for the small businessman – especially the first-time user – and make money.

Effective field support costs a fortune, but is crucial, Theodore C. Leventhal, account manager for Consolidated Computer, Inc., told a group of small systems marketing specialists at a recent Frost & Sullivan, Inc. seminar here.

"Unlike the DP manager you've learned to deal with, the small business systems prospect is almost never technically oriented and, therefore, is interested in results, not bits and bytes or feeds and speeds," Leventhal said.

The small business computer prospect is "shrewd and successful," he said. Typically, before a vendor can even get to his pitch, the businessman will start telling him what he wants a system to do.

The decision he's generally trying to make is whether to stay with an accounting computer or move up to a small business system, according to Leventhal.

So "if you're selling small business systems, you have to be aware of the competitive advantages of the relatively simple accounting computer."

The accounting computer certainly "adds a degree of sophistication to management reporting and information practices and speeds up processing from the hand-written ledger card systems. But,

(Continued on Page 36)

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IBM '75 Earnings Seen Rising, But at a Slower Pace

(Continued from Page 35)

explained.

"Growth in R&S revenues has always served as the best basis for measuring IBM's longer-term growth rate and further growth potential," Goldman, Sachs said.

"Over the past 10 years, they have grown at a 13.8% compound annual rate. During the six years 1964-1970, the average annual rate was 15.5%. However, since 1971, the average rate has been lower at 11.3% and the 1974 increase was 10.1%."

The research indicated the 1975 growth rate in the area of R&S revenues should be 15.5% because many of the factors that held the increase to 10.1% in 1974 have moderated, including the purchase pattern and the exchange rate of the dollar, which impacted 1974 R&S revenues.

Therefore, IBM should show an increase of 6.1% in overall revenues, Goldman, Sachs said, ending the year with revenues of $13.4 billion compared with 1974's $12.67 billion.

Translating this into profits, Goldman, Sachs predicted gross profits from sales will fall from $2.9 billion to around $2.4 billion in 1975.

At the same time, however, the gross profits from R&S should rise from 1974's $5 billion to $5.9 billion this year.

Therefore, in gross profits Goldman, Sachs expects IBM to report an increase of around $437 million in 1975 over the 1974 results.

At the same time, selling, general and administrative (SG&A) expenses should rise in 1975 in total dollars even though they will be a smaller percentage of revenues (37% as compared with 1974's 37.5%), according to the report.

This indicates pretax income will amount to $3.65 billion in 1975 for a pretax margin of 27.2%, compared with the $3.4 billion pretax income in 1974 for a 27.1% margin.

This would translate into a slight increase in the net with the 1975 earnings projected at $1.9 billion or $13.09 per share compared with the $1.8 billion or $12.47 per share registered last year.

Small Systems Support Called Crucial

(Continued from Page 35)

most important, it calls for the least in-house change," Leventhal said.

Unlike small computer systems, accounting computers like those available from Burroughs, Philips, NCR and Nixdorf require no extensive keyboard operator orientation, he said.

"The files are always accessible so the boss can pull one right in the middle of the updating process," according to Leventhal.

"As a vendor, you can be more effective if you supply the hardware and software entirely, rather than relying on an outside software house," he advised.

Support is extremely important when it comes to software. "Take your software and maintenance people to visit the user so he knows you have that support. The lone sales representative, competing against the depth demonstrated by competition such as IBM, just won't sell," he said.

CW Photo by N. French

Theodore C. Leventhal

No Standard Packages

As for industry standard packages, there really is no such thing, he said. The small businessman is very particular about how his correspondence and invoices look to his customers, and he doesn't want to change his image to conform to somebody else's system.

The first-time user won't readily learn to make his own changes – and he doesn't have to. "Your competition is out there geared to providing this support, and they will continue to take the hand-holding approach."

The local reputation of a vendor's support team varies even within large companies, depending on the quality of software and field engineering support, he said.

Vendors should know about installations in similar businesses in the prospect's area. Taking a prospect to see his competitor's system working effectively can be a big help, he said.

Another plus can come from employing a salesman dealing in a specialized line of business and understanding its problems, he noted.

In the small systems line, the sale representative's experience is a much more integral part of the support team, especially if he has any technical ability, Leventhal said.

He may be able to make quick and easy repairs to programs free of charge – a great boost to customer-vendor relationships.

THE BELL SYSTEM DATASPEED 40 TERMINAL
DATASPEED 40 IS A MODULAR SYSTEM OF COMPONENTS CONSISTING OF:
DISPLAYS
IMPACT PRINTERS
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System/32 Expected to Increase Independent Sales

By Nancy French

Of the CW Staff

NEW YORK – Ironically, IBM's introduction of the System/32 will do more to increase sales for other small systems vendors than the combined efforts of all those vendors to date, predicted David E. Ferguson, publisher of *System/3 World*.

Once the loyal System/3 Model 6, 8 or 10 user starts looking at the 32, he'll also begin to investigate independent hardware, Ferguson told marketing specialists at a recent Frost & Sullivan, Inc. seminar here.

It's a case of "how you gonna keep 'em down on the farm once they've seen Kansas City," Ferguson theorized. Some may actually choose the 32, but once they begin to look, they will realize something else may provide a better price/performance ratio.

Historically speaking, the System/3 has dominated the small business systems marketplace, Ferguson explained. System/3 Model 6, 8 and 10 users will find in the 32, available at about half the monthly rental of a small Model 8, a good means of saving money without sacrificing performance, he said.

The System/32, announced in January, is in many ways a small System/3. The basic 16K System/32 leases for $770/mo; the minimum usable configuration of the System/3 Model 8 – with 16K storage – leases for $1,584/mo.

The current version of the System Control Program supports only one job stream.

"The System/32 is not really a computer, but rather a computerized office machine the user will learn to treat more like his Xerox copier than a computer in a traditional sense," according to Ferguson.

Only one language – RPG – is offered, compared with the System/3 which accepts RPG, Cobol, Fortran, BAL and Basic, he said, in hopes of isolating the first-time user from the problems of computer languages.

This is truly a system "for the user who wants to slip on his payables diskette, make the music go round and round and come out here," Ferguson said.

A Turnkey System

The System/32 is available with Industry Application Programs which are designed to make an installation a turnkey system. But many such business systems are available on that basis, he noted.

Comparing a minicomputer to a small business system, Ferguson said, "a minicomputer is a small, very fast 16-bit general-purpose machine with fixed word lengths.

A small business system, on the other hand, is much more, he said. "It has a central processing unit with an instruction set capable of handling variable-length record operands. It usually is equipped with peripherals such as a printer and disk or tape storage, software, translators, operating systems and applications programs," he said.

"While companies like Basic/Four Corp. and Singer Co. would argue this, the System/32 is the first machine to bring business DP to users with no computer training," Ferguson said.

Honeywell Cuts Executives' Pay

MINNEAPOLIS – Honeywell, Inc.'s senior executives are experiencing the firm's earnings downturn with thinner paychecks.

The cuts reflect the firm's incentive payment plan for its top 28 executives, who receive salary plus payments linked to the firm's performance.

Chairman of the Executive Committee and former Chief Executive Officer James H. Binger's pay totaled $183,917 in 1974, down $104,583 from his 1973 pay under the incentive payment plan.

President Edson W. Spencer's pay cut was less severe, dropping to $172,808 from $186,000 in 1973 when he was executive vice-president.

This is what all the talk is about: the new Dataspeed® 40 service from the Bell System.

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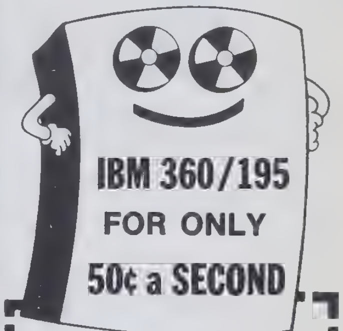
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9:00- 9:45	Introduction and *Computerworld* Report
10:00-11:15	Workshops – Phase I
11:15-11:30	Coffee Break
11:30-12:45	Workshops Repeated
1:00- 2:00	Luncheon
2:15- 3:00	Wrap-Up Panel

SPECIAL AFTERNOON SESSIONS
3:15- 4:30 Daily (Open to all Caravan attendees)

EXPOSITION
First two days – 10:00 A.M. to 6:00 P.M.
Third day – 10:00 A.M. to 5:00 P.M.

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Exposition and Forum: Seattle Center,
305 Harrison Street.

San Fran. May 6-8 (Tues., Wed., Thurs.)
Exposition and Forum: Hyatt Regency
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FORUM REGISTRATION FORM

Advance Registration is not required for the Exposition.
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Please copy this form to register additional people. Remember, there is a $15 discount for each 3 days registered. The same or different people may register – in any combination of days. If we receive more than one of these forms in the same envelope, we'll total up the number of forum days on all forms and take off $15 for each group of 3 days registered.

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UK DP Sales Continue to Grow in '74 Third Quarter

LONDON – Total sales by the UK computer industry, including mainframe sales and services, were up during the third quarter of 1974 over those of a year ago, according to figures released by the Department of Trade and Industry here.

Sales by the industry totaled over $337 million in the third quarter compared with $231.8 million in the year-ago period and $294 million in the preceding 1974 quarter.

Mainframe sales totaled almost $93.2 million, or 1,187 systems sold, compared with $69.3 million or 876 units in the second quarter.

Both mainframe sales and exports improved from the year-ago third quarter, a report in *Computer Weekly* said, and are back to the level achieved during the fourth quarter of 1973, prior to the start of the three-day work week caused by the energy shortage.

Peripheral sales during the third quarter stood at $145.8 million, up from $131.5 million in the preceding quarter. Exports showed almost no increase over the second quarter, the article said.

This lack of rapid growth followed two years in which peripheral sales surpassed mainframe sales and more than doubled in value.

Payments Deficit Static

The UK balance of payments deficit in DP equipment remained about the same as during the second quarter, at $69.3 million, most of which stemmed from imports of parts, which cost $109.9 million.

Total exports of all DP equipment during the third quarter reached $143.4 million compared with $69.3 million during the year-ago period and $129 million registered in the preceding quarter.

But this figure is only slightly above the $138.6 million generated in the fourth quarter of 1973.

Mainframe exports during the third quarter totaled $46.8 million or 402 units compared with $39.7 million or 324 units in the second quarter, the figures showed.

Imports of mainframes dropped to under $21.5 million from $26.3 million in the second quarter and overall DP imports were up only slightly to $212.7 million from $198.4 million in the 1974 second quarter.

Service Sector

In the area of services, business was improved over the year-ago period and also the preceding second quarter.

Revenues from all service sectors totaled nearly $76.8 million compared with less than $64.8 million in the 1973 third quarter.

But not all sectors showed growth. Revenues from programming services declined to $14.6 million in the third quarter compared with $15.1 million in the second quarter and $16.8 million in the first quarter.

Most of the decline resulted from reductions in government spending on programming, the article indicated.

However, sales of processing services stood at $46.6 million, up from $34.8 million in the year-ago quarter and $38.9 million in the preceding period.

Custom program processing reached $19.9 million compared with $17.5 million in the second quarter, while processing of packages grew to $11.8 million from about $7.7 million in the second quarter.

Exports in the service area totaled $3.3 million, up only slightly from those in the second quarter and were about $480,000 more than in the year-ago period.

Although sales to private industries increased dramatically in the third quarter, the decline in business with the government sector continued, particularly in sales of programming services which accounted for most of the drop in this area.

International News

Ontario Ministry Selects 370/168s To Update Its Three Service Centers

By Molly Upton

Of the CW Staff

TORONTO – The Ontario Ministry of Government Services has selected IBM to supply hardware in the first part of its three-phase tender to update its three service centers.

Final contenders were Univac with 1110s, Honeywell with 66/80s and IBM with 370/168s, according to D.A. Alexander, assistant deputy minister of management and information services for the Ministry of Government Services.

The units will replace three IBM 370/158s, a 360/40 and a Univac 65 and 1106, he said. Last year the government consolidated its four centers into three.

Although IBM bid three 168s, "the computer technology award does not necessarily mean we will implement three 168s," he said.

In the "total final analysis," IBM was the low bidder, he said, after consideration of factors such as lowest operating cost, marketability, implementation costs unique to particular vendors and vendor support, he said.

Marketability was a concern, he said, since the government centers market services to the private sector as well as performing government work.

First Phase

The first phase was to select computer technology; then peripherals, which will begin soon; and then in two years the government will evaluate how to finance the equipment, i.e., purchase or lease/purchase.

The IBM hardware will be obtained on a straight two-year lease, he said, and installations will be staggered to allow orderly conversions.

"Some pretty comprehensive benchmark results verified the hardware costs," Alexander said.

"We went through a very complex analysis of our own installation, taking a whole year's workload and breaking it down into all the various components necessary to operate in peak hour, load hour, average hour, average day, etc.

The ministry did all kinds of extrapolated analyses and pulled actual workload content matching for a benchmark that represented its particular peak hour, peak day, average day and average-hour workload.

It brought that down to a very small comprehensive package embodying specific criteria in units of measurement the vendors could understand, he said.

Reassessing Technology

Alexander explained the philosophy behind selecting computer technology rather than specific machines. "Because of the expense of going through a massive tender of this kind, we committed that we would buy a machine and stay with the technology approximately through the life of the technology stream."

"What we're doing is getting ourselves set through these three versions of one tender at three different time cycles to look at that technology position and reassess it. Also, with a long implementation time, we want to make sure the vendors do all they said they would throughout the process," he said.

Foreign Orders & Installations

Cornell University's Arecibo Observatory in Puerto Rico has installed a computer system from Harris Corp.'s Computer Systems Division to speed up studies on Arecibo's radar-radio telescope.

Establecimientos Metalurgicos Santa Rosa, an Argentine steel company, has ordered an NCR Century 251.

The Littlewoods Organization Ltd., a mail-order and chain-store firm in England, has ordered a Honeywell Series 60 and System 700 minicomputer equipment for use with an on-line mail-order entry and accounting system.

Kawasaki Steel Corp. of Japan has installed a third Univac 1110 to be used for production control, management information and personnel applications.

Burroughs Corp. has received an order from the Royal Dutch Meteorological Institute for a dual processor B6700 valued at more than $2.5 million. The system will be used to produce weather forecasts every three hours on a continuous basis for the Netherlands and northern Europe.

The Ontario Credit Union League has ordered a Burroughs B2700 to provide additional in-house computer backup.

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Send your copy, issue date, size, and section desired, along with your check for the full amount (we must have payment in advance from first-time advertisers) to: Brian Sweeney, Classified Advertising, *Computerworld* 797 Washington St., Newton, MA 02160. For further information, or a complete rate card, call Brian at (617) 965-5800.

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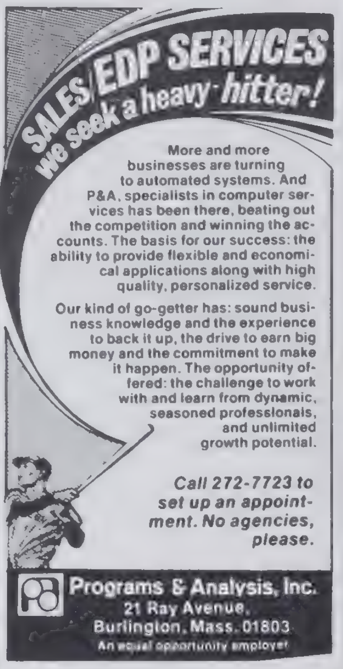

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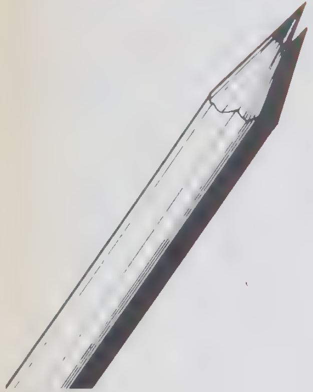

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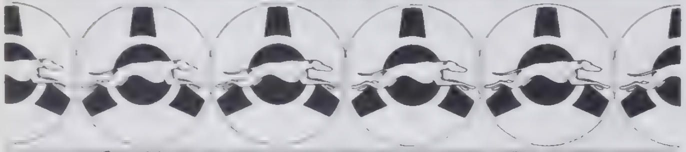

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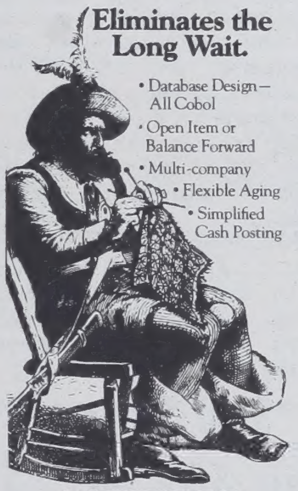

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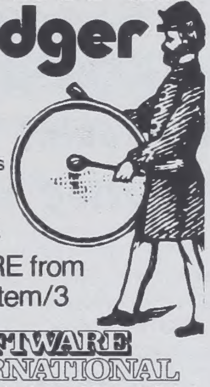

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GA Reports Loss for Quarter, Half Year

ANAHEIM, Calif. – General Automation, Inc. (GA), in recovering from its short-lived involvement with silicon on sapphire (SOS), bit the bullet during the second quarter with a $2.5 million provision for obsolete inventory. This caused a loss in both the quarter and half year.

During the second quarter, the firm lost $2.1 million compared with earnings of $927,000 or 37 cents a share in the year-ago period.

Revenues dipped slightly to $14 million from $14.1 million during the year-ago period.

Six-month earnings also reflected the charge, with a loss of $1.9 million compared with earnings of $1.8 million or 72 cents a share in the same period last year.

Revenues for the six months rose to $28.2 million from $26.1 million in the same 1974 period.

"Although we elected to 'bite the bullet' and make the provision for obsolete inventory, we believe the company is in a stronger financial position because of it," Chairman Lawrence A. Goshorn said. Backlog as of Feb. 1 was $23 million compared with $21 million a year ago, he said, and working capital was $20 million.

"These sales results have been caused primarily by lower than expected domestic bookings and by OEM product order cancellations," explained Goshorn.

"The lower bookings are attributable to a sharp economic drop-off in our traditional factory and electronics market and to a temporary product-line gap created by the withdrawal of our silicon-on-sapphire microcomputers.

"The production and inventory reductions designed to counteract the decreased shipping levels could not be effected rapidly enough, thus creating an inventory buildup of materials," he said.

The company is accelerating product development "in all areas" he said, and is marketing in additional industries.

As a result, GA has received orders in the network business since the end of January, and its European orders continue to increase, Goshorn said.

Profits Soaring at MAI Due to New Revenues Mix

NEW YORK – Service revenues and sales of Basic/Four systems are replacing rental of unit record equipment as the economic mainstay of Management Assistance, Inc. (MAI), which displayed increasingly strong earnings and revenues in the first quarter.

Earnings and revenues should be "significantly ahead" of the record highs achieved in fiscal 1974, said President Raymond P. Kurshan, who forecast 15% to 20% growth in revenues.

Earnings soared to $1.6 million or 5 cents a share compared with $139,000 or 1 cent a share in the year-ago period.

Fifth Profitable Quarter

This represents the company's fifth successive profitable quarter after seven years of operational losses, observed Kurshan.

Revenues rose to $22.9 million from $17.4 million in the same period last year.

In explaining the new revenue mix, Kurshan said that, whereas in 1970 about 90% of MAI's volume was derived from rental of unit record and other older equipment, only 18% of this quarter's revenues came from this source.

Service fees were responsible for 30% of the revenues, and sales of Basic/Four for 44%, he said.

Basic/Four sales increased to $10.2 million, 71% of which came from international operations, compared with $5.6 million, with 61% from international operations.

Datapoint Earnings Still Rising, Expected to Increase 30% in '75

SAN ANTONIO, Texas – Datapoint Corp.'s 1975 earnings should continue their upward trend from fiscal 1974, although it is likely the increase will be closer to the lower end of the 30% to 40% increase forecast by the firm last September, said President H.E. O'Kelley.

During the six months, earnings rose to nearly $2 million or $1.12 a share compared with $1.5 million or 82 cents a share in the year-ago period.

There was a $639,000 tax credit in the 1975 period and a $489,000 credit in the year-ago period.

Revenues rose 43% to $20.9 million compared with $14.7 million in the same period last year.

During the quarter, results were also improved, with earnings totaling $1.1 million or 62 cents a share, including a $390,000 tax credit, compared with $767,000 or 41 cents a share in the same 1974 quarter when there was a $224,000 tax credit.

The purchase value of equipment shipped for sale or lease during the half year rose 69% to $42.6 million compared with $25.2 million a year ago.

Data General 24-Week Results Up

SOUTHBORO, Mass. – Data General Corp.'s second-quarter earnings and revenues continued the pace set in the first quarter, with six-month and second-quarter results improved over those of a year ago.

Second-quarter earnings rose to nearly $2.9 million or 35 cents a share compared with $1.9 million or 23 cents a share in the year-ago period.

Revenues totaled $24.6 million compared with $14.9 million in the same 1974 quarter.

Even Contributions

For the six months, earnings were contributed fairly evenly from both quarters, for a total of $5.7 million or 70 cents a share compared with $3.7 million or 46 cents a share last year.

Revenues during the half year reached almost $48.8 million compared with $29.8 million in the year-ago period.

MCI Gets More Financing, Capital

WASHINGTON, D.C. – MCI Communications Corp. recently negotiated agreements with several firms and banks for additional financing and working capital.

Ericsson Centrum has established a $4 million lease credit facility for the company's acquisition of equipment.

CIT-Alcatel has agreed to provide $5 million in lease credits, and MCI revised its credit agreement with a group of banks headed by the First National Bank of Chicago that gives it $4.9 million in additional working capital.

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Earnings Reports

METRIDATA
Year Ended Dec. 31

	1974	a1973
Shr Ernd	$.79	.....
Revenue	4,976,000	$5,193,000
Tax Cred	134,000	.....
Earnings	292,000	(361,000)

a-Restated to give retroactive effect to a change in accounting for internally developed software programs, increasing the loss in 1973 by $27,000.

COMPUSCAN
Three Months Ended Feb. 28

	1975	a1974
Shr Ernd	$.24	$.18
Revenue	2,756,000	2,101,000
Tax Cred	151,000	123,000
Earnings	369,000	281,000
9 Mo Shr	.59	.43
Revenue	7,280,000	5,532,000
Tax Cred	371,000	300,000
Earnings	892,000	660,000

a-Restated.

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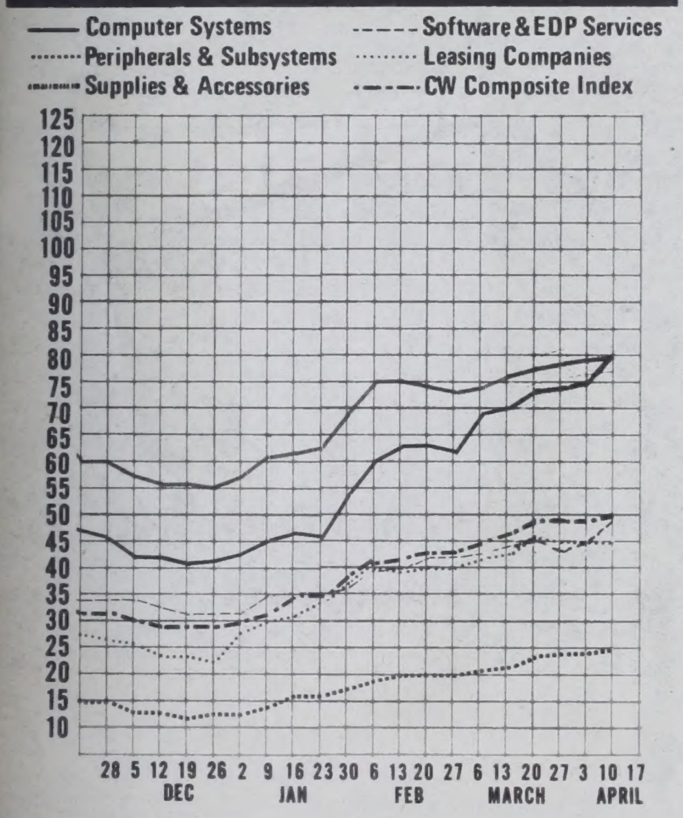

DOCUTEL
Year Ended Dec. 31

	1974	1973
Shr Ernd	.....	$1.61
Revenue	$25,147,000	29,449,000
Loss Disc Op	292,000	1,156,000
Tax Cred	.....	1,948,000
Earnings	(941,000)	4,079,000
3 Mo Rev	6,258,000	5,772,000
Loss Disc Op	292,000	590,000
Spec Chg	.....	a653,000
Loss	6,000	1,482,000

a-Tax adjustment.

MICROFORM DATA SYSTEMS
Three Months Ended Jan. 31

	1975	a1974
Shr Ernd	$.05	.....
Revenue	4,029,008	$1,812,468
Earnings	233,318	(33,810)
6 Mo Shr	.10	.....
Revenue	7,633,529	2,855,462
Earnings	490,606	(364,797)

a-Restated to reflect accounting change.

XEROX
Year Ended Dec. 31

	1974 (000)	1973 (000)
Shr Ernd	$4.18	$3.80
Revenue	3,576,442	2,989,694
Earnings	331,083	300,484
3 Mo Shr	1.03	.98
Revenue	976,599	806,001
Earnings	81,481	77,177

KEANE ASSOCIATES
Year Ended Dec. 31

	1974	1973
Shr Ernd	$.43	$.65
Revenue	4,401,000	3,736,000
Spec Cred	.....	a192,041
Earnings	361,000	543,041

a-Gain on disposal of computer equipment leased to customers.

DATA GENERAL
Three Months Ended March 15

	1975	1974
Shr Ernd	$.35	$.23
Revenue	24,639,000	14,942,000
Earnings	2,866,000	1,859,000
6 Mo Shr	.70	.46
Revenue	48,758,000	29,779,000
Earnings	5,682,000	3,714,000

ACADEMY COMPUTING
Year Ended Dec. 31

	1974	1973
Shr Ernd	$.07	$.03
Revenue	677,422	533,957
Earnings	91,720	41,323

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 9, 1975

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1974 RANGE (1)	CLOSE APR 9 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	91	+3 3/4	+4.2
O	COMPUTER AUTOMATION	2- 14	6 1/4	+ 1/4	+4.1
N	CONTROL DATA CORP	10- 38	14 3/4	- 1/2	-3.2
N	DATA GENERAL CORP	10- 38	27 1/2	+3 3/8	+13.9
O	DATAPOINT CORP	5- 15	14	0	0.0
O	DIGITAL COMP CONTROL	1- 5	2 3/4	+1 1/4	+83.3
N	DIGITAL EQUIPMENT	46-121	92	+4 3/4	+5.4
N	ELECTRONIC ASSOC.	1- 3	2 1/4	- 1/8	-5.2
A	ELECTRONIC ENGINEER.	4- 11	7 7/8	+ 1/2	+6.7
N	FOXBORO	19- 48	28 1/8	- 3/8	-1.3
O	GENERAL AUTOMATION	6- 40	10 1/4	+1 5/8	+18.8
O	GRI COMPUTER CORP	1- 2	1/4	0	0.0
N	HEWLETT-PACKARD CO	54- 93	91	+2 1/2	+2.8
N	HONEYWELL INC	18- 86	28 7/8	- 1/8	-0.4
N	IBM	152-251	209 1/2	+5 3/4	+2.8
O	MEMOREX	2- 5	4 1/8	- 3/8	-8.3
O	MICRODATA CORP	1- 5	2 7/8	+ 1/2	+21.0
N	NCR	14- 40	26 3/8	- 3/8	-1.4
N	PERKIN-ELMER	15- 40	27	- 1/2	-1.8
N	RAYTHEON CO	21- 39	36 3/8	+3 3/8	+10.2
N	SPERRY RAND	24- 44	35 1/4	+ 3/4	+2.1
A	SYSTEMS ENG. LABS	1- 4	3 3/4	+ 3/4	+25.0
O	ULTIMACC SYSTEMS INC	1- 2	3 1/2	0	0.0
N	VARIAN ASSOCIATES	6- 13	9 3/8	+ 1/2	+5.6
N	WANG LABS.	7- 20	12 1/8	+ 1/8	+1.0
N	XEROX CORP	50-127	70 1/2	+1 5/8	+2.3

LEASING COMPANIES

EXCH		1974 RANGE (1)	CLOSE APR 9 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 7	2 7/8	+ 1/4	+9.5
A	COMMERCE GROUP CORP	2- 6	3	- 1/8	-4.0
A	COMPUTER INVSTRS GRP	0- 4	7/8	- 1/8	-12.5
M	DATRONIC RENTAL	1- 1	5/8	0	0.0
A	DCL INC	0- 1	1/2	- 1/8	-20.0
N	DPF INC	2- 5	4 3/8	+ 1/4	+6.0
O	EDP RESOURCES	2- 3	2	0	0.0
A	GRANITE MGT	1- 4	4	+ 3/4	+23.0
A	GREYHOUND COMPUTER	2- 6	2 5/8	0	0.0
A	ITEL	3- 6	5 3/8	- 1/4	-4.4
N	LEASCO CORP	5- 12	5 1/2	-1 1/4	-18.5
O	LEASPAC CORP	1- 2	1/2	- 1/4	-33.3
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 5	1 5/8	+ 1/4	+18.1
A	PIONEER TEX CORP	2- 10	3 1/4	- 1/8	-3.7
A	ROCKWOOD COMPUTER	0- 1	1/2	0	0.0
N	U.S. LEASING	5- 24	9 3/8	-1 1/8	-10.7

EXCH: N=NEW YORK: A=AMERICAN: P=PHIL-BALT-WASH
L=NATIONAL: M=MIDWEST: O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1974 RANGE (1)	CLOSE APR 9 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 1/4	+ 3/8	+42.8
A	APPLIED DATA RES.	1- 10	1 5/8	0	0.0
N	AUTOMATIC DATA PROC	21- 57	46 1/8	-1	-2.1
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	CENTRAL DATA SYSTEMS	4- 6	3 1/4	0	0.0
O	COMPUTER DIMENSIONS	1- 3	2 5/8	0	0.0
O	COMP ELECTION SYSTMS	3- 4	4	0	0.0
O	COMPUTER HORIZONS	1- 5	1	+ 1/4	+33.3
O	COMPUTER NETWORK	1- 2	1 3/8	0	0.0
N	COMPUTER SCIENCES	2- 4	3 1/2	- 1/4	-6.6
O	COMPUTER TASK GROUP	1- 1	5/8	+ 1/8	+25.0
O	COMPUTER USAGE	2- 4	2 1/2	- 1/8	-4.7
O	COMSHARE	2- 4	3 5/8	+ 1/4	+7.4
O	DATATAB	1- 3	1 1/8	+ 1/8	+12.5
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	11- 25	16 3/4	+ 1/2	+3.0
O	INFONATIONAL INC	1- 2	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/8	0	0.0
O	KEANE ASSOCIATES	2- 4	2 3/4	+1	+57.1
O	KEYDATA CORP	1- 6	3	0	0.0
O	LOGICON	2- 5	5	+ 3/4	+17.6
A	MANAGEMENT DATA	1- 2	2 1/8	- 1/8	-5.5
O	NATIONAL CSS INC	5- 37	7	- 1/4	-3.4
O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
A	ON LINE SYSTEMS INC	9- 30	8 1/4	- 1/4	-2.9
N	PLANNING RESEARCH	2- 5	3 5/8	+ 1/4	+7.4
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	1- 5	2 3/4	+1	+57.1
O	SCIENTIFIC COMPUTERS	1- 1	1 1/8	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1/4	0	0.0
O	TYMSHARE INC	6- 12	10 3/4	- 5/8	-5.4
O	UNITED DATA CENTER	2- 4	2 7/8	0	0.0
A	URS SYSTEMS	2- 4	2 1/2	- 3/8	-13.0
N	WYLY CORP	1- 5	3 1/2	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		1974 RANGE (1)	CLOSE APR 9 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	3- 11	6 1/8	- 1/8	-2.0
O	ADVANCED MEMORY SYS	1- 7	3 3/4	- 1/4	-6.2
N	AMPEX CORP	2- 5	5	0	0.0
O	ANDERSON JACOBSON	1- 4	2 7/8	+ 5/8	+27.7
O	BEEHIVE MEDICAL ELEC	1- 7	2 1/2	0	0.0
A	BOLT,BERANEK & NEW	5- 9	7 3/4	- 3/8	-4.6
N	BUNKER-RAMO	3- 8	6 5/8	+ 1/8	+1.9
A	CALCOMP	4- 11	6	- 1/4	-4.0
O	CAMBRIDGE MEMORIES	3- 16	3 1/2	- 3/8	-9.6
N	CENTRONICS DATA COMP	7- 23	17	+2	+13.3
O	CODEX CORP	8- 27	23	-1	-4.1
O	COGNITRONICS	1- 2	1/2	0	0.0
O	COMPUTER COMMUN.	1- 2	5/8	0	0.0
O	COMPUTER CONSOLES	2- 4	2 1/2	- 3/4	-23.0
A	COMPUTER EQUIPMENT	1- 2	1 1/2	0	0.0
O	COMPUTER MACHINERY	1- 5	1 3/8	- 1/8	-8.3
O	COMPUTER TRANSCEIVER	1- 2	1 1/8	0	0.0
O	COMTEN	1- 5	2 7/8	- 3/8	-11.5
N	CONRAC CORP	10- 22	16 5/8	0	0.0
O	DATA ACCESS SYSTEMS	2- 3	2 1/2	+ 1/4	+11.1
O	DATA 100	4- 13	11 5/8	- 1/8	-1.0
A	DATA PRODUCTS CORP	2- 5	4	+ 1/8	+3.2
O	DATA TECHNOLOGY	1- 4	1 1/2	- 1/4	-14.2
O	DATUM INC	1- 4	1	0	0.0
O	DECISION DATA COMPUT	3- 13	4 1/2	- 1/8	-2.7
O	DELTA DATA SYSTEMS	1- 2	1/4	- 1/8	-33.3
O	DI/AN CONTROLS	1- 2	3/4	0	0.0
N	ELECTRONIC M & M	1- 4	1 3/4	- 1/4	-12.5
O	FABRI-TEK	1- 3	1	0	0.0
O	GENERAL COMPUTER SYS	1- 4	1 1/2	0	0.0
N	HAZELTINE CORP	2- 7	3 3/8	- 1/8	-3.5
N	HARRIS CORP	13- 34	17 3/4	-1 1/2	-7.7
A	INCOTERM CORP	1- 6	3 5/8	+ 1/8	+3.5
O	INFOREX INC	1- 5	3	- 1/4	-7.6
O	INFORMATION INTL INC	6- 14	10 1/4	- 3/8	-3.5
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	3/8	- 1/8	-25.0
A	MILGO ELECTRONICS	6- 18	12 1/4	+ 5/8	+5.3
N	MOHAWK DATA SCI	1- 4	1 3/4	- 1/8	-6.6
O	ODEC COMPUTER SYST.	1- 3	1	0	0.0
O	OPTICAL SCANNING	2- 6	2 3/4	+ 1/4	+10.0
O	PERTEC CORP	1- 7	7 1/4	+1 7/8	+34.8
A	POTTER INSTRUMENT	1- 5	1 3/4	0	0.0
O	PRECISION INST.	1- 3	1/4	- 1/2	-66.6
O	QUANTOR CORP	2- 8	4 1/4	0	0.0
O	RECOGNITION EQUIP	2- 5	5 1/8	+ 1/2	+10.8
N	SANDERS ASSOCIATES	2- 8	6	+ 1/2	+9.0
O	SCAN DATA	1- 2	1 1/4	+ 1/8	+11.1
O	STORAGE TECHNOLOGY	6- 15	8 3/4	- 1/8	-1.4
O	SYCOR INC	4- 13	7	0	0.0
O	TALLY CORP.	1- 4	2 1/2	+ 3/8	+17.6
O	TEC INC	1- 7	2 1/2	0	0.0
N	TEKTRONIX INC	18- 48	30 1/4	+ 1/2	+1.6
N	TELEX	1- 4	1 3/4	- 1/4	-12.5
O	WANGCO INC	3- 13	4 1/4	+ 1/2	+13.3
O	WILTEK INC	1- 8	2 1/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1974 RANGE (1)	CLOSE APR 9 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	4- 6	5 1/4	0	0.0
A	BARRY WRIGHT	4- 7	5 3/4	+ 1/4	+4.5
O	CYBERMATICS INC	1- 2	5/8	0	0.0
A	DATA DOCUMENTS	23- 54	37 5/8	- 3/8	-0.9
O	DUPLEX PRODUCTS INC	6- 22	20	+ 1/2	+2.5
N	ENNIS BUS. FORMS	4- 7	6 1/2	+ 1/8	+1.9
O	GRAHAM MAGNETICS	5- 11	7 1/2	- 1/2	-6.2
O	GRAPHIC CONTROLS	6- 15	15	0	0.0
N	3M COMPANY	43- 79	49 7/8	- 5/8	-1.2
O	MOORE CORP LTD	33- 57	43 1/2	-1 1/2	-3.3
N	NASHUA CORP	15- 45	17 5/8	+ 1/4	+1.4
O	REYNOLDS & REYNOLD	6- 35	18 1/2	- 1/2	-2.6
O	STANDARD REGISTER	10- 17	16 3/4	+ 1/4	+1.5
O	TAB PRODUCTS CO	4- 11	6 1/2	- 1/2	-7.1
N	UARCO	13- 23	17 5/8	0	0.0
O	VANIER GRAPHICS CORP	3- 5	4 3/4	0	0.0
A	WABASH MAGNETICS	3- 7	3 3/4	- 1/4	-6.2
N	WALLACE BUS FORMS	14- 24	22	+1 1/8	+5.3

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